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UNITED STATES AIR FORCE

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EPI

REPORT

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ELECTRONIC PRINCIPLES INVENTORY

KEESLER TECHNICAL TRAINING CENTER

AFPT 90-EPI-825

MARCH 1990

OCCUPATIONAL ANALYSIS PROGRAM  
USAF OCCUPATIONAL MEASUREMENT CENTER  
AIR TRAINING COMMAND  
RANDOLPH AFB, TEXAS 78150-5000

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## PREFACE

This report presents the results of an Air Force Electronic Principles (EP) survey of 19 selected Air Force specialties. Authority for conducting EP surveys is contained in AFR 35-2.

Results presented in this report are part of an EP survey of 81 Air Force specialties. This survey was requested by the Chief, Common Electronics Training Program (CETP) Program Management Team (PMT) in October 1985.

The Electronic Principles Inventory (EPI) used to collect EP survey data was originally developed in 1976 by Dr Hendrick Ruck and Major Thomas O'Connor. Mr Theodore Wilcox revised and validated the EPI in 1986 as part of this survey project.

First Lieutenant Robert Hampel analyzed the data and wrote the final report. Computer programming support was provided by Ms Olga Velez and Mr Wayne Fruge, and Mr Richard Ramos provided administrative support. This report was reviewed and approved by Mr Gerald Clow, Chief, Management Applications Branch, Occupational Analysis Division, USAF Occupational Measurement Center.

This report is distributed to Air Staff sections, major commands, and other training and management personnel. Requests for additional copies should be sent to: Chief, Occupational Analysis Division (OMY), USAF Occupational Measurement Center, Randolph AFB, Texas 78150-5000.

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## REPORT SUMMARY

1. Background: This report provides data on the electronic principles (EP) used by airmen in 19 Air Force specialties (AFS) with initial training at Keesler Technical Training Center (TTC). Eighteen of the AFSCs surveyed currently attend the Keesler EP course.

2. Methodology: The USAF Electronic Principles Inventory (EPI) (AFPT 90-EPI-825) was administered to random samples of fully qualified job incumbents representing the 19 AFSCs in this report. The data were collected from March 1987 to September 1988. Some AFSCs have been affected by RIVET Workforce changes. Details are enumerated in the SURVEY ADMINISTRATION section.

3. Results: Complete survey data is provided in three appendices:

Appendix A: Keesler TTC AFSCs EP data in EPI job inventory order

Appendix B: Keesler TTC AFSCs EP data matched to Electronic Fundamentals/Applications (EF/A) STS

Appendix C: Keesler CETP AFSCs EP data matched to POI E3AQR30020 009, dated 1 June 1987

NOTE: A "generic" version of the Electronic Fundamentals/Applications (EF/A) is used in Appendix B--complete analysis requires the use of AFSC-specific proficiency codes, rather than the generic set used in the appendix.

4. Discussion and Implications: Although there is no specific regulatory guidance on the use of EPI data, the survey data lends itself to the use of cutoff scores for deciding which EPI items to include in centralized training for each AFSC. Once the training needs of the individual AFSCs have been determined, the possibility for consolidated EP training can be considered.

The AFSCs which currently attend the Keesler EP course seem appropriately enrolled. However, the POI for course E3AQR30020 009 (dated 1 June 1987) requires review. Survey data showed very weak support for 11 POI objectives, with all 18 of the AFSCs which currently attend this course reporting less than 30 percent of group members responding "Yes" to the matched EPI items. Twenty-two POI objectives had only one of the 18 AFSCs which currently attend the course where at least 30 percent members responded "Yes" to the matched EPI items. Also, 282 of the EPI items not referenced to any POI objective were used by at least 30 percent of group members in at least two of the 18 AFSCs which currently attend the EP course.

## ELECTRONIC PRINCIPLES SURVEY REPORT KEESLER TECHNICAL TRAINING CENTER

### INTRODUCTION

From missile systems maintainers to telephone switching specialists, from avionics technicians to biomedical equipment personnel, the US Air Force employs more than 50,000 worker-level (primarily 5-skill level) personnel who require Electronic Principles (EP) training. These highly skilled, technically trained airmen work in over 80 Air Force specialties (AFS) spanning 11 career fields. Furthermore, the depth and breadth of required EP training varies based on specialty needs. In short, the USAF spends vast amounts of money, manpower, and time to ensure that airmen are properly trained in electronic principles.

To make the best use of these resources, the USAF Common Electronics Training Program (CETP) was designed to consolidate and standardize Air Force EP training where possible and practical. This is primarily accomplished through special EP courses taught at four USAF Technical Training Centers (TTC). These EP courses teach the EPs common to two or more AFSs. Another part of the CETP is the development of common training modules. Specific blocks of EP instruction are developed by one TTC, then shared with the other TTCs which teach that EP subject. By selectively combining and standardizing Air Force EP training, the USAF makes best use of limited training resources.

Not all Air Force EP training is conducted in special EP courses, however. For example, some EP subjects are used in only one AFS. Students learn these generally advanced topics in AFSC-awarding courses, building on the more basic EP subjects from the common EP course. Also, some AFSs require very few EPs, and airmen in these specialties receive EP training only in their AFSC-awarding courses.

As with other Air Force technical training, EP training programs can profit from objective analysis of specific training requirements. These requirements can be analyzed objectively using occupational survey data. This EP survey provides data which can be used to analyze the specific EP training requirements in CETP courses and AFSC-awarding courses alike. The instrument used to collect EP survey data is the Electronic Principles Inventory (EPI).

### BACKGROUND

The USAF EPI is a knowledge- and skills-based job inventory which identifies the electronic principles, skills, and equipment an airman uses in the performance of his or her job.

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The EPI was originally developed by Dr Hendrick Ruck and Major Thomas O'Connor in 1976. An in-depth discussion of the original concept, development, and validation of the EPI can be found in USAFOMC Technical Note 77-02, "The Development and Application of the Electronic Principles Job Inventory". Mr Theodore Wilcox revised and validated the EPI in 1986 for this survey.

The EPI contains two sections. First is a background section containing demographic and job satisfaction questions. The second section contains 712 electronic principles, skills, and equipment questions covering 39 EP subject areas. Below are some example questions taken from the EPI. The 39 EPI subject areas are listed in Table 1.

After completing the background section, job incumbents respond "Yes" or "No" to the 712 EPI questions. The result is a "profile" of electronic principles, skills, and equipment used by the incumbent in his or her present job. This electronic principle "profile" can be combined with the "profiles" of other job incumbents to produce a "profile" for the entire AFS.

## EXAMPLE EPI QUESTIONS

### Example Principles Questions

- A4-4 Do you use electron tube characteristic curves?
- G1-20 Do you use parity bit codes?
- H4-33 Do you use "FM" modulation principles?

### Example Skills Questions

- C1-8 Do you calculate values of transistor amplifier voltage, current, or power gain?
- E2-1 Do you trace schematic or block diagrams of circuits containing frequency sensitive filters?
- I1-4 Do you measure RF effective power?

### Example Equipment Questions

- B4-2 Do you use spectrum analyzers?
- D3-5 Do you perform tasks on variable resistor voltage regulators?
- J1-8 Do you work on dynamic microphones?

TABLE 1  
EPI SUBJECT AREAS

SUBJECT AREA NUMBER	SUBJECT AREA TITLE
A1	Direct/Alternating Current
A2	Electro/Mechanical Devices
A3	Solid-State Circuits and Devices
A4	Tubes
A5	Soldering or Solderless Connections
B1	Multimeters
B2	Oscilloscopes
B3	Signal (Function) Generators
B4	Test Equipment
C1	Transistor Amplifier Circuits
C2	Transistor Amplifier Stabilization Circuits
C3	Coupling Circuits
C4	Electron Tube Amplifier Circuits
C5	Operational Amplifiers
C6	Magnetic Amplifiers
D1	Power Supply Circuits
D2	Power Supply Filters
D3	Power Supply Voltage Regulators
E1	Resistive Capacitive Inductive Circuits
E2	Frequency Sensitive Filters
F1	Oscillators
F2	Multivibrators
F3	Waveshaping Circuits
F4	Limiter/Clamper Circuits
G1	Digital Logic Numbering Systems and Functions
G2	Computers
G3	Digital Circuits
G4	Digital to Analog (D/A) and Analog to Digital (A/D) Converters
H1	Connections (Transmission Lines and Waveshaping Circuits)
H2	Microwave Oscillators and Amplifiers
H3	Resonant Cavities
H4	Transmitters and Receivers
H5	Antennas
I1	Radio Frequency Measurements
I2	Radio Frequency Calculations
J1	Microphones and Speakers
J2	Photosensitive Devices
J3	Storage Type Display Tubes
J4	Television, Laser, and Infrared Systems

## SURVEY ADMINISTRATION

As mentioned in the PREFACE, data were collected for this survey from over 80 AFSSs (78 AFSSs, 3 Reporting Identifiers). Survey data were collected in four increments, from March 1987 through March 1989. A total of 24,651 EPI booklets were mailed to active duty airmen worldwide. After each of the first three increments, interim survey reports were published by USAFOMC. These reports are all numbered AFPT 90-EPI-825, and are dated July 1988 (EPI-1), January 1989 (EPI-2), and February 1989 (EPI-3). There was no separate report of data collected in EPI-4. Results were combined with those of the first three increments to produce the final reports. There are a total of five final EPI reports, one for each of the following: Chanute TTC, Keesler TTC, Lowry TTC, Sheppard TTC, and the Air Force Military Training Center (AFMTC), located at Lackland AFB. This report presents results only for AFSCs with technical training courses at Keesler Technical Training Center.

A discussion about data collection and reporting procedures is necessary at this point. Some of the AFSCs included in this EP survey have been affected by RIVET Workforce (RWF) changes during various phases of the survey process. We have tried to keep up with these changes and adapt accordingly to provide the best, most useful survey data possible. Fortunately, not all AFSCs were affected by RWF, and some AFSCs were changed by RWF before survey mailout. These AFSCs did not require any special consideration and include 30351, 30352, 30353, 30450, 30451, 30454, 30456, 30554, and 49350.

Unfortunately, some AFSCs changed after survey data collection, which presented a challenge. Personnel from various AFSCs were reorganized and redistributed into new AFSCs as a result of RWF changes. These redistributed groups can be easily identified in this report because they carry the generic "X" for the skill-level designation. Using survey data collected from the "old" AFSCs, we were able to create new data sets representing these new AFSCs, allowing analysis of the data under the "new" specialty structure.

For example, we collected survey data from the following AFSCs which no longer exist due to RWF changes: 32152, 32550, 32551, 32850, 32851, 32853, 32854, and 32855. These "old" AFSCs were redistributed among several "new" AFSCs as a result of RWF changes. The "new" AFSCs which have initial training at Keesler TTC include 455X1A, 455X1B, 455X1C, 455X2A, 455X2B, 455X2C, 455X4, 455X6, 456X1A, and 456X1B. As mentioned above, we recombined the survey data provided by airmen in the "old" AFSCs to make new data sets which match the "new" AFSCs, making analysis of EP training needs possible.

First, we placed all survey respondents from the "old" AFSCs into a single group. Next, using the Uniform Airmen Record, we created a group which included all assigned personnel in the "new" AFSCs. We then matched individuals by Social Security Account Number (SSAN), linking their "old" AFSC to their "new" AFSC. Finally, we created new data sets based on the results of the match, and these data sets represent the EP use of the personnel in the "new" AFSCs. (NOTE: It was necessary to include 7-skill level personnel in the "new" AFSC groups for matching purposes, because some of the personnel in

the "old" AFSCs had upgraded to 7-level since taking the survey. However, the survey data are still useful, because the data were collected while the respondents were still 5-levels.)

Here is a summary of the AFSCs included in this report:

<u>AFSC</u>	<u>TITLE</u>
30351	Air Traffic Control Radar
30352	Aircraft Control and Warning Radar
30353	Automatic Tracking Radar
30450	Wideband Communications Equipment
30451	Navigational Aids Equipment
30454	Ground Radio Communications
30456	Satellite Communications Systems Equipment
30554	Electronic Computer and Switching Systems
455X1A	Avionics Guidance and Control Systems (MAC)
455X1B	Avionics Guidance and Control Systems (SAC)
455X1C	Avionics Guidance and Control Systems (TAF)
455X2A	Communication and Navigation Systems (MAC)
455X2B	Communication and Navigation Systems (SAC)
455X2C	Communication and Navigation Systems (TAF)
455X4	Airborne Warning and Control Radar
455X6	Airborne Command Post Communications Equipment
456X1A	Electronic Warfare Systems (Strategic)
456X1B	Electronic Warfare Systems (Tactical)
49350	Communications-Computer Systems Control

The survey administration for these 19 AFSCs was spread over three increments of the EPI, from March 1987 through September 1988. To be eligible for the survey, airmen in these specialties had to have at least 4 weeks' experience in their job, could not be within 90 days of retirement nor expecting reassignment within 60 days. A random sample of survey eligible personnel was selected, and booklets were mailed to airmen worldwide. All useable EPI booklets that were returned to USAFOMC were included in the final samples. Table 2 shows the number of assigned personnel at the time of survey, as well as final sample size, for each AFSC in this report.

TABLE 2  
SPECIALTY REPRESENTATION OF SURVEY SAMPLES

<u>DUTY AFSC</u>	<u>TOTAL ASSIGNED</u>	<u>SURVEY SAMPLE</u>
30351	652	278
30352	463	139
30353	529	186
30450	1,754	240
30451	512	171
30454	2,632	297
30456	652	212
30554	1,910	985
*455X1A	965	212
*455X1B	800	169
*455X1C	683	172
*455X2A	1,093	193
*455X2B	836	148
*455X2C	488	87
*455X4	103	59
*455X6	184	83
*456X1A	938	113
*456X1B	989	107
49350	1,286	258

\* Denotes AFSCs affected by RIVET Workforce changes. For a complete description of these changes, refer to the SURVEY ADMINISTRATION section of this report

## RESULTS

Each completed EPI survey booklet shows which EPs the respondent uses in his or her present job. When the responses of all survey respondents from a specific group are combined, the results are shown as percent of group members using each of the 712 EP items. This listing of all EPI items and the percent of group members responding "Yes" is the EP "profile" of that group. Appendix A shows percent group members responding "Yes" information for all 712 EPI items, listed in EPI job inventory order.

To facilitate development of Specialty Training Standards (STS), subject-matter experts (SME) matched EPI items to appropriate block(s) of the Electronic Fundamentals/Applications (EF/A) part of the STS, also known as the STS Attachment 2. For this study, a "generic" version of the EF/A STS was used for the match. All blocks of the EF/A were matched, and the proficiency codes are NOT specific to individual AFSCs. Still, this information (located in Appendix B) can be used to determine which blocks of the STS Attachment 2 should be included in individual STSs.

Subject-matter experts also matched EPI items to the objectives from Plans of Instruction (POI) for Air Force courses which teach electronic principles. This match of EPI items to appropriate POI objective(s), when combined with survey data, shows how well the POI objectives are supported. For example, if many group members respond "Yes" to the EPI items matched to an objective, then that objective is considered well supported by survey data. If, however, few group members respond "Yes", the objective is not well supported.

For this study, SMEs matched the 712 EPI items to the POI for course E3AQR30020 009, dated 1 June 1987. This match (with survey data) is shown as Appendix C of this report. The first section shows the EPI items matched to the POI, while the second section shows the EPI items which were not referenced to any POI objectives.

Following is a summary of the appendices, which show the survey results:

Appendix A: Keesler TTC AFSCs EP data in EPI job inventory order

Appendix B: Keesler AFSCs EP data matched to Electronic Fundamentals/Applications (EF/A) STS

Appendix C: Keesler CETP AFSCs EP data matched to POI E3AQR30020 009, dated 1 June 1987



## DISCUSSION AND IMPLICATIONS

We collect EPI data to assess the use of electronic principles by different Air Force specialties. For each AFSC surveyed, this data shows the percent members responding "Yes" to each of the 712 EPI items. We can use this data to select for each AFSC the items we wish to include in centralized training. Once we've selected for each AFSC the EPI items we wish to include in centralized training, we can look for commonalities among those items for the possibility of combined EP training.

How should we use the EPI data to select the items we wish to include in centralized training? Currently, there is no regulatory guidance on the use of EPI data for the development of centralized training programs (or STSs). AEC Regulation 52-22 states only that "EPI studies provide valuable information for curriculum development or validation in terms of percent members requiring a range of electronic principle knowledge in the performance of their job." Lacking direction from regulations, we must devise an intelligent method for using this data.

The EPI percent members responding "Yes" data lends itself to the use of a cutoff score for selecting items to teach in centralized training. For each AFSC, EPI items at or above the cutoff score are selected for centralized training, while items with scores below the cutoff (in percent members responding "Yes") are left for other training methods, such as on-the-job training (OJT). This cutoff score can theoretically be anything from 1 to 100 percent members responding "Yes". If we select 1 percent as our cutoff, we must train all airmen in all EPI items used throughout the AFSC. If 100 percent is selected, we will only train the EPI items used by every airmen within the AFSC. These cutoffs are the extremes, and we should find some middle ground for our cutoff score.

For example, if we select a cutoff score of 50 percent, it means that the EPI items we train will be used by at least every other student. Similarly, if we select items with 20 percent members responding "Yes" as our cutoff, we know that at least every fifth student will need to know those items. The task is to select a cutoff which provides training that is effective without being excessive. Therefore, the practical upper limit for this cutoff score should be 50 percent members responding "Yes" (any higher, and training would be ineffective). Twenty percent should be considered the practical lower limit (any lower, and training would be excessive).

Regardless of the cutoff scores selected, there are some basic observations we can make based on the survey data. For example, based on the data presented in Table 3, it appears that the AFSCs which currently attend the Keesler EP course are appropriately enrolled. However, the survey data also indicate that the course content needs review, as evidenced by several POI objectives with little support from survey data, as well as some EPI items which have relatively high percent members responding "Yes", but are not referenced to any POI objective.

Table 3 shows the total number of EPI items and the number of EPI items used by 30 percent of members for each AFSC in this report. This cutoff of 30 percent is only an example, but serves to show the trend of EP use among the AFSCs. These data show that all AFSCs which currently attend the Keesler EP course appear to be appropriately enrolled. Also, AFSC 493X0 personnel do not currently attend the course, and this seems appropriate based on the low number of EPI items used by 30 percent or more of 49350 personnel.

The second area for consideration, as mentioned above, is the current course content for the Keesler EP course. Brief examination of the information in Appendix C reveals some areas where improvements may be possible. Survey data show very weak support for 11 of the POI objectives. For each of these objectives, all of the 18 AFSC groups which currently attend the course had less than 30 percent members responding "Yes" to the matched EPI items. Also, 22 POI objectives were supported by only one of the 18 AFSCs which currently attend the course. That is, for each of these 22 objectives, only one AFSC of the 18 reported that matched EPI items were used by 30 percent or more of group members. These objectives should be reviewed to see if they are best taught in the common EP course, or if perhaps they may best be left to individual AFSC-awarding courses.

Furthermore, there are 282 unmatched EPI items which had at least 30 percent members responding "Yes" in at least two of the AFSCs which currently attend the EP course. These items are found in Appendix C in the TASKS NOT REFERENCED section. Some examples of these items are listed in Table 4. These items should be reviewed for possible inclusion in the Keesler EP course.

These two areas for course review (unsupported POI objectives and items which appear supported by survey data but are not included in the course) are only beginnings of the in-depth review of all survey data that will be necessary. Some additional considerations will include the scheduling of instruction topics, and space, equipment, time, and financial limitations.

In conclusion, the data presented in this report should serve as the foundation for selecting the EPI items to train in centralized courses. Once this foundation, based on the EP use of each AFSC, is determined, it can be modified by these other considerations, resulting in a plan for training which is mindful of each specialty's needs, while avoiding excesses that waste precious Air Force resources.

TABLE 3  
NUMBER OF TOTAL EPI ITEMS USED/  
NUMBER OF EPI ITEMS USED BY 30 PERCENT OF GROUP MEMBERS  
(BY AFSC)

<u>DUTY AFSC</u>	<u>ITEMS USED BY 30 PERCENT</u>	<u>TOTAL USED</u>
*30351	494	709
*30352	390	712
*30353	373	712
*30450	243	688
*30451	385	702
*30454	359	701
*30456	197	712
*30554	248	663
*455X1A	76	605
*455X1B	68	643
*455X1C	69	692
*455X2A	330	697
*455X2B	164	688
*455X2C	188	662
*455X4	304	673
*455X6	372	687
*456X1A	221	710
*456X1B	158	700
49350	37	597

\* Denotes AFSCs which currently attend the Keesler EP course

TABLE 4

EXAMPLES OF EPI ITEMS NOT REFERENCED TO POI  
WITH AT LEAST 30 PERCENT MEMBERS RESPONDING "YES"  
IN AT LEAST TWO AFSCs

ITEM NUMBER/TITLE	303	303	303	304	304	304	304	304	305	455	455	455	455	455	455	455	456	456	456
	51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C	X4	X6	X1A	X1B	X1B
A1-17 Do you adjust relays	41	55	50	46	55	44	26	31	21	18	14	39	25	17	14	61	17	17	17
A1-39 Do you calibrate or adjust circuits using variable transformers	51	53	49	40	48	47	34	20	15	17	10	39	26	22	20	51	27	19	19
A2-03 Do you troubleshoot DC motor component parts	37	34	51	14	22	33	29	21	20	17	14	24	18	9	7	18	18	8	8
A3-15 Do you use IC substitution information	45	37	43	32	27	43	18	42	12	8	7	20	10	20	39	42	27	16	16
B3-02 Do you use signal generators to perform alignments, adjustments, or calibrations	90	73	76	74	81	81	65	44	21	9	14	78	48	52	76	87	67	58	58
B4-02 Do you use spectrum analyzers	92	72	62	78	89	61	81	12	11	5	6	60	42	31	93	95	71	71	71
C4-04 Do you troubleshoot electron tube amplifiers to circuit level components	46	65	43	21	61	54	23	4	5	8	3	42	22	21	34	42	16	10	10
C5-04 Do you adjust op amp bias, offsets, or drift	58	44	39	30	43	38	23	25	7	7	9	17	12	7	25	27	18	14	14
D1-12 Do you perform tasks on inverters (DC to AC converters	49	51	49	43	37	46	28	35	25	28	26	46	22	24	63	46	29	18	18

TABLE 4 (CONTINUED)

EXAMPLES OF EPI ITEMS NOT REFERENCED TO PQ1  
WITH AT LEAST 30 PERCENT MEMBERS RESPONDING "YES"  
IN AT LEAST TWO AFSCs

ITEM NUMBER/TITLE	303	303	303	304	304	304	304	305	455	455	455	455	455	455	455	456	456
	51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C	X4	X6	X1A
D3-05 Do you perform tasks on variable resistor power supply voltage regulators	77	71	63	50	67	67	35	45	14	16	18	51	30	31	39	57	35
F2-03 Do you troubleshoot to isolate a faulty multivibrator circuit	71	66	63	33	71	41	18	40	9	7	6	43	22	20	32	41	25
G1-25 Do you trace data flow through logic schematic diagrams	74	51	44	35	51	35	30	72	21	19	13	34	22	21	85	45	51
G2-07 Do you use computer flowcharts or diagrams	63	6	25	5	12	11	19	73	20	13	17	9	8	0	63	20	30
G4-02 Do you trace data flow through D/A converters	73	45	34	18	32	24	33	37	8	14	11	25	18	21	85	24	36
H1-04 Do you construct transmission lines	27	33	19	23	49	46	17	6	2	1	2	48	35	48	22	31	25
H1-16 Do you pressurize or purge waveguide assemblies	67	68	64	27	4	3	47	1	2	2	3	37	30	24	92	8	31
H4-06 Do you troubleshoot AM transmitters to subassemblies or circuit cards	30	12	13	8	65	64	12	2	1	0	0	37	28	31	8	69	26
I1-03 Do you measure RF average power	88	72	81	33	85	39	39	1	2	1	3	50	38	48	95	48	36

# T A B L E   O F   C O N T E N T S

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## Report Option Table for Modules

Option	Status
Primary Sort	Inventory Sequence
Secondary Sort	Not Used
Print Suppress	Not Used

## Report Option Table for Tasks

Option	Status
Primary Sort	Inventory Sequence
Secondary Sort	Not Used
Print Suppress	Not Used

## Description of Reported Module Factors

Col	Factor	Source vector	Title	Module Statement	Number Members	Mean	S.D.	Max	Min	Valid
1	TITLE									

## Description of Reported Task Factors

Col	Factor	Source vector	Title	Task Statement	Number Members	Mean	S.D.	Max	Min	Valid
1	TITLE									
2	F0014	GP0014/PHP		All DAFSC 30351	278	45.58	27.00	97.84	.36	712
3	F0015	GP0015/PHP		All DAFSC 30352	139	36.06	25.12	98.56	.72	712
4	F0016	GP0016/PHP		All DAFSC 30353	186	34.69	24.04	98.92	1.08	712
5	F0038	GP0041/PHP		All DAFSC 30450	240	26.65	23.10	97.50	.00	712
6	F0039	GP0042/PHP		All DAFSC 30451	171	37.50	27.49	97.66	.00	712
7	F0040	GP0043/PHP		All DAFSC 30454	297	34.75	26.12	96.97	.00	712
8	F0017	GP0020/PHP		All DAFSC 30456	212	22.36	19.51	93.87	.94	712
9	F0018	GP0021/PHP		All DAFSC 30554	985	24.20	24.02	97.16	.00	712
10	F0088	GP0111/PHP		All DAFSC 455X1A	212	12.02	18.72	98.58	.00	712
11	F0089	GP0112/PHP		All DAFSC 455X1B	169	11.59	18.15	98.82	.00	712
12	F0090	GP0113/PHP		All DAFSC 455X1C	172	10.89	17.26	97.67	.00	712

Col	Factor	Source	vector	Title	Number Members	----- Based on All Tasks Within Range -----			
						Mean	S.D.	Max	Min Valid
13	F0091	GP0114/PHP		All DAFSC 455X2A	193	30.27	23.35	98.45	.00 712
14	F0092	GP0115/PHP		All DAFSC 455X2B	148	20.78	18.38	97.97	.00 712
15	F0093	GP0116/PHP		All DAFSC 455X2C	87	21.43	20.52	98.85	.00 712



Electronic Principles Inventory (EPI) data for Air Force specialties is presented below in job inventory order. Data for this report was collected from job incumbents during the period March 1987 - September 1988

Percent members responding "YES" is shown for each specialty listed. Where skill level is not specified, both 5 and 7 skill levels are included (e.g., DAFSC 000X0 includes 00050 and 00070).

For assistance in using this EPI printout phone USAFOMC/OMYA, at AUTOVON 487-6623.

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51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

# 0001 EPI Electronic Principles Inventory

## 0002 I. General Electronic/Electricity

### 0003 I 1. A1 Direct/Alternating Current

A 1	A1-1 Do you use metric terms (example milli, kilo, mega)	90	88	85	91	86	81	81	74	75	68	66	78	79
A 2	A1-2 Do you use basic DC electrical/electronic terms	98	99	99	98	97	97	94	96	98	95	94	98	97
A 3	A1-3 Do you use basic AC electrical/electronic terms	98	97	99	96	97	97	93	91	98	96	94	98	97
A 4	A1-4 Do you trace schematic or block diagrams of circuits containing conductors, fuses, lamps, switches, or batteries	95	90	92	96	96	94	86	93	98	95	95	95	98
A 5	A1-5 Do you troubleshoot circuits containing conductors, fuses, lamps, switches, or batteries	94	89	91	93	92	93	83	89	96	95	94	93	97
A 6	A1-6 Do you calculate values of DC voltage, current, resistance, or power	70	67	72	54	75	62	47	47	32	38	35	54	37
A 7	A1-7 Do you calculate values of AC effective voltage, average voltage, or peak-to-peak voltage	64	64	65	50	71	59	44	44	26	31	30	53	41
A 8	A1-8 Do you calculate values of frequency, phase relationship, or wave length	68	61	69	53	79	62	48	52	26	28	28	56	41
A 9	A1-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78
A 10	A1-10 Do you troubleshoot circuits to isolate a faulty resistor	88	83	89	82	90	83	57	69	65	51	49	85	61
A 11	A1-11 Do you calibrate or adjust circuits by using variable resistors	92	85	90	84	92	85	74	77	67	62	63	82	59
A 12	A1-12 Do you calculate the value of a resistor required for a circuit	46	50	68	47	56	45	29	30	23	21	22	42	26

D	T Task	Task Title	303	303	303	304	304	304	304	305	455	455	455	455	455
Y	Nbr		51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B X2C
A	13	Al-13 Do you determine ohmic value of a resistor using the color code	80	81	90	72	87	82	49	57	46	34	38	74	55 55
A	14	Al-14 Do you ohm check resistors	90	84	89	85	91	84	61	74	71	63	62	89	65 70
A	15	Al-15 Do you trace schematic or block diagrams of circuits containing relays	94	84	89	85	92	87	69	74	96	89	91	95	92 94
A	16	Al-16 Do you troubleshoot circuits to isolate a faulty relay	91	81	88	81	91	85	59	70	96	88	85	93	89 93
A	17	Al-17 Do you adjust relays	41	55	50	46	55	44	26	31	21	18	14	39	25 17
A	18	Al-18 Do you perform tasks on contacts, cores, coils, armatures, or springs	47	59	58	44	62	60	29	37	29	24	19	46	29 32
A	19	Al-19 Do you continuity check relays	86	75	83	68	82	80	56	57	84	76	78	88	79 86
A	20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	86	76	83	71	83	85	51	47	35	39	42	75	51 63
A	21	Al-21 Do you troubleshoot circuits to isolate a faulty inductor, choke, or choke coil	79	71	81	62	78	78	39	39	25	23	28	69	38 38
A	22	Al-22 Do you calculate values of circuit total inductance	31	29	38	26	30	26	16	11	7	8	8	21	11 13
A	23	Al-23 Do you calculate values of circuit or component inductive reactance	26	29	34	24	29	25	13	10	7	8	8	20	10 13
A	24	Al-24 Do you calculate values of circuit voltage or current in circuits containing inductors	36	38	49	30	37	35	18	15	8	8	9	26	16 15
A	25	Al-25 Do you calibrate or adjust circuits by using variable inductors	69	56	57	49	68	67	28	25	11	14	12	58	32 34
A	26	Al-26 Do you ohm check inductors	74	68	76	58	61	72	39	33	26	27	27	62	34 43
A	27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	93	83	90	86	93	86	71	80	75	74	72	86	65 74
A	28	Al-28 Do you troubleshoot circuits to isolate a faulty capacitor	88	81	87	80	91	82	58	72	65	49	51	80	54 52
A	29	Al-29 Do you calculate values of circuit total capacitance	35	34	44	27	36	29	24	23	31	23	22	22	13 17
A	30	Al-30 Do you calculate values of circuit or component capacitive reactance	29	32	37	27	33	26	19	18	18	15	15	22	11 17
A	31	Al-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors	38	42	49	33	43	36	25	25	20	17	16	28	19 21
A	32	Al-32 Do you calibrate or adjust circuits using variable capacitors	79	61	63	57	77	76	34	38	28	26	23	60	35 41
A	33	Al-33 Do you ohm check capacitors	78	73	82	68	77	74	51	65	49	39	45	76	46 52
A	34	Al-34 Do you use capacitor color codes in your present job	29	30	41	20	31	26	14	16	10	9	9	20	14 10
A	35	Al-35 Do you trace schematic or block diagrams of circuits containing transformers	91	82	89	82	91	86	66	71	64	76	69	84	65 72
A	36	Al-36 Do you troubleshoot circuits to isolate a faulty transformer	86	80	88	77	88	81	56	65	56	63	55	79	53 55
A	37	Al-37 Do you calculate transformer voltage or current step-up or step-down ratios	45	51	56	33	44	43	28	25	18	18	17	32	22 20
A	38	Al-38 Do you calculate impedance of transformers	28	28	34	25	28	26	15	14	7	9	8	20	11 13
A	39	Al-39 Do you calibrate or adjust circuits using variable transformers	51	53	49	40	48	47	34	20	15	17	10	39	26 22
A	40	Al-40 Do you ohm check transformers	72	77	77	63	73	76	44	49	42	47	41	67	47 49
A	41	Al-41 Do you measure transformer output voltage	82	78	85	73	85	80	53	63	50	56	51	76	50 62
A	42	Al-42 Do you trace schematic or block diagrams of circuits containing three phase transformers	77	68	65	47	70	42	43	36	32	47	44	49	28 38

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51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

72 65 62 41 63 40 39 30 30 43 33 42 25 31

41 45 41 26 29 26 30 14 9 11 9 22 11 10

A 43 A1-43 Do you troubleshoot circuits to isolate a faulty three phase transformer

A 44 A1-44 Do you adjust three phase transformers

## 0004 I 2. A2 Electro/Mechanical Devices

A 45 A2-1 Do you trace schematic or block diagrams of circuits containing DC motors

A 46 A2-2 Do you troubleshoot circuits to isolate a faulty DC motor

A 47 A2-3 Do you troubleshoot DC motor component parts

A 48 A2-4 Do you perform tasks on DC motor component parts

A 49 A2-5 Do you trace schematic or block diagrams of circuits containing AC motors

A 50 A2-6 Do you troubleshoot circuits to isolate a faulty AC motor

A 51 A2-7 Do you troubleshoot AC motor component parts

A 52 A2-8 Do you perform tasks on AC motor component parts

A 53 A2-9 Do you trace schematic or block diagrams of circuits containing DC generators

A 54 A2-10 Do you troubleshoot to isolate a faulty DC generator

A 55 A2-11 Do you troubleshoot DC generator component parts

A 56 A2-12 Do you perform tasks on component parts of DC generators

A 57 A2-13 Do you trace schematic or block diagrams of circuits containing AC generators

A 58 A2-14 Do you troubleshoot circuits to isolate a faulty AC generator

A 59 A2-15 Do you troubleshoot AC generator component parts

A 60 A2-16 Do you perform tasks on component parts of AC generators

A 61 A2-17 Do you trace schematic or block diagrams of circuits containing alternators

A 62 A2-18 Do you troubleshoot circuits to isolate a faulty alternator

A 63 A2-19 Do you troubleshoot alternator component parts

A 64 A2-20 Do you perform tasks on component parts of alternators

A 65 A2-21 Do you trace schematic or block diagrams of circuits containing synchros or servos

A 66 A2-22 Do you troubleshoot circuits to isolate a faulty synchro or servo

A 67 A2-23 Do you troubleshoot synchro or servo component parts

A 68 A2-24 Do you perform tasks on component parts of synchros or servos

A 69 A2-25 Do you trace schematic or block diagrams of circuits containing choppers

A 70 A2-26 Do you troubleshoot circuits to isolate a faulty chopper





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				51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C		
A 137			A4-18 Do you troubleshoot to isolate a faulty CRT	88	79	65	24	15	20	12	54	14	4	5	43	26	23		
A 138			A4-19 Do you adjust or calibrate circuits that control CRT operations	87	81	68	23	20	22	14	55	10	4	3	42	24	24		
A 139			A4-20 Do you perform tasks on electrostatic CRT	41	34	42	10	7	14	4	22	4	2	3	24	16	14		
A 140			A4-21 Do you perform tasks on electromagnetic CRT	73	60	47	16	9	11	8	29	8	4	4	30	20	17		

0007 I 5. A5 Soldering or Solderless Connections

A 141	A5-1 Do you solder or desolder hardware connections	93	85	87	90	94	92	83	90	95	95	87	96	93	98
A 142	A5-2 Do you solder or desolder component connections such as resistors, capacitors, diodes, transformers, etc	94	85	86	88	93	87	63	79	66	61	54	87	64	59
A 143	A5-3 Do you solder or desolder printed circuit board connections	84	76	69	81	79	78	52	72	35	27	29	68	37	40
A 144	A5-4 Do you solder or desolder multi-layer circuit board connections	42	32	29	35	29	49	23	30	20	12	10	35	16	15
A 145	A5-5 Do you perform high reliability soldering	70	65	68	62	69	65	45	61	57	48	52	61	43	57
A 146	A5-6 Do you use crimping tool to repair or make connections	90	82	78	85	89	91	79	79	98	96	89	96	96	99
A 147	A5-7 Do you use wire wrap tool to make connections	67	45	37	63	40	52	49	59	32	26	24	30	24	32
A 148	A5-8 Do you use punch-on tool to make connections	32	31	22	52	30	53	19	28	20	12	19	16	11	23
A 149	A5-9 Do you repair or fabricate connectors or cables on multiconductor cables	77	75	72	60	60	90	57	56	58	59	58	79	72	80
A 150	A5-10 Do you repair or fabricate connectors or cables on coaxial cables	93	86	85	88	93	92	85	48	75	65	73	96	92	99
A 151	A5-11 Do you repair or fabricate connectors or cables on triaxial cables	36	53	18	28	25	24	40	17	21	10	13	27	16	28
A 152	A5-12 Do you repair or fabricate connectors or cables on ribbon cables	31	21	20	20	12	37	17	54	9	5	6	15	11	11

0008 II. Test Equipment

0009 II 1. B1 Multimeters

B 153	B1-1 Do you use the multimeter to measure DC voltage values	95	88	89	97	98	93	86	97	99	97	98	98	98	99
B 154	B1-2 Do you use the multimeter to measure AC voltage values	95	87	89	95	97	92	87	94	99	99	98	98	95	99
B 155	B1-3 Do you use the multimeter to extend the range of voltmeters using external shunts	36	30	49	33	46	29	34	24	24	18	20	32	26	25
B 156	B1-4 Do you use the multimeter to measure DC current values	86	73	78	75	69	61	71	68	60	62	57	72	58	57
B 157	B1-5 Do you use the multimeter to measure AC current values	76	70	73	70	67	56	72	60	60	60	56	70	57	56
B 158	B1-6 Do you use the multimeter to extend the range of ammeters using external shunts	24	22	34	19	25	19	24	16	16	13	15	21	16	16
B 159	B1-7 Do you use the multimeter to measure circuit resistance	80	76	85	82	84	77	74	70	90	88	88	85	82	79
B 160	B1-8 Do you use the multimeter to measure component resistance	90	85	87	89	93	85	70	82	90	83	79	92	72	70

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51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0010 II 2. B2 Oscilloscopes

B 161 B2-1 Do you use the oscilloscope to measure time to  
determine frequency  
B 162 B2-2 Do you use the oscilloscope to measure time (rise,  
fall, pulse width, etc)  
B 163 B2-3 Do you use the oscilloscope to measure AC voltage  
B 164 B2-4 Do you use the oscilloscope to measure DC voltage  
B 165 B2-5 Do you use the oscilloscope to measure ripple voltages  
B 166 B2-6 Do you use the oscilloscope to measure phase jitters  
B 167 B2-7 Do you use the oscilloscope to observe signal/data  
patterns  
B 168 B2-8 Do you use the oscilloscope to observe lissajous  
patterns  
B 169 B2-9 Do you use the oscilloscope to observe phase  
relationships  
B 170 B2-10 Do you use attenuator probes with oscilloscopes  
B 171 B2-11 Do you use delay time multipliers with  
oscilloscopes

0011 II 3. B3 Signal (Function) Generators

B 172 B3-1 Do you use signal generators (SG) to perform  
operational checks  
B 173 B3-2 Do you use SG to perform alignments, adjustments,  
or calibrations  
B 174 B3-3 Do you use SG to troubleshoot circuits  
B 175 B3-4 Do you use audio sine-wave signal generators  
B 176 B3-5 Do you use audio non-sinusoidal signal generators  
B 177 B3-6 Do you use RF less than 1,000MH signal generators  
B 178 B3-7 Do you use RF greater than 1,000MH signal generators  
B 179 B3-8 Do you use white noise signal generators  
B 180 B3-9 Do you use pattern signal generators  
B 181 B3-10 Do you use pseudo-random signal generators  
B 182 B3-11 Do you use time mark signal generators  
B 183 B3-12 Do you use multi-function (square/sine/triangular)  
signal generators  
B 184 B3-13 Do you use TV signal generators

0012 II 4. B4 Test Equipment Types

B 185 B4-1 Do you use frequency counters  
B 186 B4-2 Do you use spectrum analyzers

D	T Ysk	Task Title	303	303	303	304	304	304	304	304	305	455	455	455	455	455	455	455
Y Nbr			51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C		
B 187		B4-3 Do you use field strength testers	45	12	15	8	43	11	7	3	6	3	3	10	7	13		
B 188		B4-4 Do you use digital multimeters	94	83	89	95	94	91	84	94	93	91	87	94	89	92		
B 189		B4-5 Do you use digital logic probes	44	28	34	20	22	21	17	36	11	2	7	12	9	10		
B 190		B4-6 Do you use capacitance testers	52	35	44	26	33	34	10	16	35	26	23	24	14	17		
B 191		B4-7 Do you use capacitor substitution boxes	6	8	20	9	5	10	6	4	0	11	8	8	9	7		
B 192		B4-8 Do you use DC restorers (CRT rejuvenators)	5	6	8	8	5	4	5	3	2	1	3	3	5	3		
B 193		B4-9 Do you use logic current tracers	12	12	12	7	7	7	7	9	3	4	3	3	5	3		
B 194		B4-10 Do you use tube testers	53	60	53	20	72	44	5	4	16	21	8	46	24	18		
B 195		B4-11 Do you use logic pulsers	9	12	10	9	7	7	7	9	2	3	3	1	4	3		
B 196		B4-12 Do you use logic analyzers	11	16	21	9	7	8	10	24	2	2	3	3	5	2		
B 197		B4-13 Do you use signature analyzers	3	7	9	5	6	4	6	3	3	2	3	2	2	3		
B 198		B4-14 Do you use reflectometers	11	13	7	13	7	22	8	4	37	20	23	65	60	56		

## 0013 III. Amplifier Circuits

## 0014 III 1. Cl Transistor Amplifier Circuits

C 199	Cl-1 Do you trace block diagrams of circuits containing transistor amplifiers	86	69	60	75	82	81	54	51	30	33	34	73	47	63
C 200	Cl-2 Do you trace schematic diagrams of transistor amplifier circuits	85	69	59	70	81	79	47	49	25	27	27	69	40	49
C 201	Cl-3 Do you troubleshoot to isolate a faulty transistor amplifier	81	66	57	69	77	78	42	47	19	18	17	68	36	40
C 202	Cl-4 Do you troubleshoot transistor amplifiers to circuit level components	71	64	52	61	70	74	25	42	10	9	11	56	27	32
C 203	Cl-5 Do you troubleshoot transistor amplifier distortion	47	36	28	35	44	55	17	21	5	4	5	37	18	22
C 204	Cl-6 Do you adjust or align transistor amplifiers	66	48	41	56	56	64	32	27	6	7	7	50	21	29
C 205	Cl-7 Do you measure transistor amplifier voltage, current, or power gain	60	53	41	59	51	61	37	31	12	9	9	49	26	30
C 206	Cl-8 Do you calculate values of transistor amplifier voltage, current or power gain	33	29	26	28	30	32	19	14	3	4	3	23	10	14
C 207	Cl-9 Do you work on compound-connected (Darlington Pair) transistor amplifiers	60	14	18	24	58	38	6	17	4	4	5	15	14	16
C 208	Cl-10 Do you work on cascade-connected transistor amplifiers	67	33	17	20	50	46	9	13	2	5	3	37	23	21
C 209	Cl-11 Do you work on paraphase transistor amplifiers	13	15	15	9	8	26	5	3	1	2	5	21	14	10
C 210	Cl-12 Do you work on push-pull transistor amplifiers	69	55	45	46	60	70	19	29	12	10	15	60	31	34
C 211	Cl-13 Do you work on audio transistor amplifiers	34	15	30	62	57	78	22	13	6	5	8	64	39	45
C 212	Cl-14 Do you work on wideband transistor amplifiers	32	25	19	50	15	39	25	5	2	4	4	31	19	18
C 213	Cl-15 Do you work on IF transistor amplifiers	82	59	51	61	62	77	47	6	6	3	6	68	39	46
C 214	Cl-16 Do you work on RF transistor amplifiers	77	51	38	60	76	76	53	10	4	5	6	64	39	47
C 215	Cl-17 Do you work on buffer transistor amplifiers	68	58	44	51	69	66	34	22	15	12	13	40	27	21
C 216	Cl-18 Do you work on complementary symmetry transistor amplifiers	36	14	13	15	13	34	7	7	2	6	3	22	15	17
C 217	Cl-19 Do you work on DC transistor amplifiers (switching applications)	63	45	48	41	47	48	19	35	15	14	15	39	26	23



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0015 III 2. C2 Transistor Amplifier Stabilization Circuits

C 218	C2-1 Do you trace schematic diagrams of amplifier stabilization circuits	51	42	24	30	38	54	15	22	11	12	12	37	26	30
C 219	C2-2 Do you troubleshoot amplifier stabilization circuits to circuit level components	47	41	21	25	36	51	12	19	5	8	5	33	21	22
C 220	C2-3 Do you perform tasks on emitter (swamping) resistor stabilization amplifiers	53	37	20	29	29	53	16	23	8	8	6	45	24	26
C 221	C2-4 Do you perform tasks on self-bias stabilization amplifiers	35	22	18	24	25	46	13	12	6	8	7	30	17	17
C 222	C2-5 Do you perform tasks on thermistor stabilization amplifiers	51	29	19	22	35	45	16	17	10	7	8	41	23	24
C 223	C2-6 Do you perform tasks on diode stabilization amplifiers	53	39	26	27	38	47	17	24	10	10	8	42	24	28
C 224	C2-7 Do you perform tasks on double diode stabilization amplifiers	25	17	12	13	19	22	8	9	2	4	4	17	12	10

0016 III 3. C3 Coupling Circuits

C 225	C3-1 Do you trace block diagrams of circuits containing coupling circuits	69	63	53	46	63	72	32	34	21	21	22	55	41	44
C 226	C3-2 Do you trace schematic diagrams of coupling circuits	68	62	54	42	64	71	26	33	18	18	18	54	36	39
C 227	C3-3 Do you troubleshoot circuits to isolate a faulty coupling circuit	64	58	49	40	58	68	23	30	11	15	11	50	33	29
C 228	C3-4 Do you troubleshoot coupling circuits to circuit level components	57	56	43	35	50	64	16	26	6	10	8	41	27	24
C 229	C3-5 Do you perform tasks on direct coupling circuits	64	52	45	40	58	68	25	29	15	14	13	51	35	32
C 230	C3-6 Do you perform tasks on capacitive-resistive coupling circuits	55	50	42	33	50	59	17	24	11	13	11	45	28	29
C 231	C3-7 Do you perform tasks on capacitive-inductive coupling circuits	51	50	36	33	53	59	17	17	8	8	9	44	26	28
C 232	C3-8 Do you perform tasks on transformer coupling circuits	65	60	47	39	53	65	17	23	12	11	12	50	31	30
C 233	C3-9 Do you perform tasks on optical coupling circuits	17	9	10	10	8	14	6	10	0	0	2	4	5	2

0017 III 4. C4 Electron Tube Amplifier Circuits

C 234	C4-1 Do you trace block diagrams of circuits containing electron tube amplifiers	55	76	47	36	69	60	44	6	13	22	6	51	28	31
C 235	C4-2 Do you trace schematic diagrams of electron tube amplifiers	54	75	47	33	70	59	40	6	9	18	5	51	26	28
C 236	C4-3 Do you troubleshoot to isolate a faulty electron tube amplifier	53	71	46	34	67	59	38	5	10	17	5	49	25	22

D T Y	Task Nbr	Task Title	303 51	303 52	303 53	304 50	304 51	304 54	304 56	305 54	455 X1A	455 X1B	455 X1C	455 X2A	455 X2B	455 X2C
C	237	C4-4 Do you troubleshoot electron tube amplifiers to circuit level components	46	65	43	21	61	54	23	4	5	8	3	42	22	21
C	238	C4-5 Do you troubleshoot electron tube amplifier distortion	33	45	30	14	50	40	19	3	3	2	1	28	15	13
C	239	C4-6 Do you adjust or align electron tube amplifiers	46	62	40	26	59	50	31	4	4	8	1	35	23	18
C	240	C4-7 Do you measure electron tube amplifier voltage, current, or power gain	39	67	38	30	54	45	38	4	7	7	2	39	22	18
C	241	C4-8 Do you calculate values of electron tube amplifier voltage, current, or power gain	22	40	24	12	30	24	21	3	0	3	1	18	8	8
C	242	C4-9 Do you perform tasks on paraphase electron tube amplifiers	9	17	19	3	6	20	3	0	0	1	1	18	12	11
C	243	C4-10 Do you perform tasks on push-pull electron tube amplifiers	29	46	30	10	46	42	5	2	4	4	1	36	21	20
C	244	C4-11 Do you perform tasks on audio electron tube amplifiers	9	10	15	13	40	43	4	1	2	2	2	39	23	20
C	245	C4-12 Do you perform tasks on voltage regulator electron tube amplifiers	38	58	41	13	58	37	16	4	5	8	3	39	23	21
C	246	C4-13 Do you perform tasks on common grid electron tube amplifiers	37	53	35	12	49	37	13	2	6	9	2	34	20	21
C	247	C4-14 Do you perform tasks on common cathode electron tube amplifiers	40	57	36	14	50	39	15	3	6	9	2	33	19	18
C	248	C4-15 Do you perform tasks on cathode follower electron tube amplifiers	40	60	40	12	63	38	7	2	4	7	2	38	22	20

## 0018 III 5. C5 Operational Amplifiers

C 249	C5-1 Do you trace block or schematic diagrams of circuits containing operational amplifiers (op amps)	83	62	55	45	71	61	40	50	22	20	28	35	29	21
C 250	C5-2 Do you troubleshoot to isolate a faulty op amp circuit	77	59	56	41	64	58	30	44	14	14	19	31	19	16
C 251	C5-3 Do you calculate op amp gain	24	24	36	18	23	22	17	15	4	3	4	8	5	6
C 252	C5-4 Do you adjust op amp bias, offsets, or drift	58	44	39	30	43	38	23	25	7	7	9	17	12	7
C 253	C5-5 Do you use or apply operational amplifiers for general purpose (inverting or non-inverting)	73	57	52	33	63	52	21	41	9	12	13	23	18	15
C 254	C5-6 Do you use or apply operational amplifiers as differential/comparators	66	45	47	28	56	41	19	30	9	9	8	20	13	9
C 255	C5-7 Do you use or apply operational amplifiers for summing	66	45	46	15	40	28	16	21	10	13	15	11	8	6
C 256	C5-8 Do you use or apply operational amplifiers for unity gain amplifier (buffer)	49	41	40	25	51	37	16	18	10	6	10	13	10	7
C 257	C5-9 Do you use or apply operational amplifiers as active filters	31	17	19	21	37	23	17	14	5	7	7	10	9	5
C 258	C5-10 Do you use or apply operational amplifiers as oscillators	58	37	38	28	54	37	23	26	8	8	6	27	17	17
C 259	C5-11 Do you use or apply operational amplifiers as integrators	49	31	39	12	39	22	14	16	8	8	11	15	9	8
C 260	C5-12 Do you use or apply operational amplifiers for differentiators	56	35	44	19	44	29	13	23	6	6	6	16	9	8
C 261	C5-13 Do you use or apply operational amplifiers for power supplies (voltage regulators)	71	58	51	38	60	45	32	42	20	16	19	31	18	18



D T Task Y Mbr	Task Title	303	303	303	304	304	304	304	305	455	455	455	455	455	455
		51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C
D 281	D1-7 Do you perform tasks on full-wave rectifier power supplies	79	77	74	56	74	70	38	52	21	19	17	62	32	37
D 282	D1-8 Do you perform tasks on full-wave bridge rectifier power supplies	76	76	74	57	73	73	42	52	24	18	18	64	34	38
D 283	D1-9 Do you perform tasks on three-phase rectifier power supplies	67	61	43	32	36	27	31	28	15	14	11	30	16	17
D 284	D1-10 Do you perform tasks on voltage multipliers (doubblers/triplers)	63	57	52	36	54	51	27	31	13	12	15	47	26	28
D 285	D1-11 Do you perform tasks on DC to DC converters	52	44	43	51	63	62	29	40	19	17	20	42	27	29
D 286	D1-12 Do you perform tasks on inverters (DC to AC converters)	49	51	49	43	37	46	28	35	25	28	26	46	22	24
D 287	D1-13 Do you perform tasks on switching power supplies	25	13	16	19	19	42	14	15	4	4	3	10	7	6

0022 IV 2. D2 Power Supply Filters

D 288	D2-1 Do you trace block diagrams of circuits containing power supply filters	69	73	59	46	63	70	35	49	19	18	30	54	32	44
D 289	D2-2 Do you trace schematic diagrams of power supply filters	66	72	60	43	62	68	30	46	17	14	23	52	28	37
D 290	D2-3 Do you troubleshoot circuits to isolate a faulty power supply filter	65	70	55	42	60	66	24	46	14	9	17	50	26	25
D 291	D2-4 Do you troubleshoot power supply filters to circuit level components	59	63	48	40	53	62	18	37	7	5	8	42	24	22
D 292	D2-5 Do you perform tasks on capacitive power supply filters	61	68	51	38	55	64	25	40	14	9	16	48	26	32
D 293	D2-6 Do you perform tasks on inductive power supply filters	55	60	46	31	41	58	19	21	9	9	9	43	22	26
D 294	D2-7 Do you perform tasks on L-type power supply filters	34	42	31	23	25	52	12	12	4	4	8	39	22	24
D 295	D2-8 Do you perform tasks on Pi-type power supply filters	31	45	32	26	29	54	14	11	2	4	5	35	20	24
D 296	D2-9 Do you perform tasks on T-type power supply filters	31	26	27	23	22	40	13	9	2	4	5	27	18	20
D 297	D2-10 Do you perform tasks on resistive capacitive (RC) power supply filters	58	61	50	28	53	58	20	30	14	10	13	49	24	25
D 298	D2-11 Do you perform tasks on inductive capacitive (LC) power supply filters	56	59	45	30	49	58	19	22	9	10	10	44	22	24

0023 IV 3. D3 Power Supply Voltage Regulators

D 299	D3-1 Do you trace block diagrams of circuits containing power supply voltage regulators	86	80	78	71	82	79	54	62	26	27	33	62	39	47
D 300	D3-2 Do you trace schematic diagrams of power supply voltage regulator circuits	82	79	80	67	82	77	45	60	22	21	24	60	34	38
D 301	D3-3 Do you troubleshoot circuits to isolate a faulty power supply voltage regulator	81	77	77	64	78	75	46	60	21	15	19	60	31	26
D 302	D3-4 Do you troubleshoot power supply voltage regulators to circuit level components	72	73	70	55	72	70	27	50	8	7	8	47	26	24
D 303	D3-5 Do you perform tasks on variable resistor power supply voltage regulators	77	71	63	50	67	67	35	45	14	16	18	51	30	31

D T Task Y Nbr	Task Title	303	303	303	304	304	304	304	305	455	455	455	455	455	455
D 304	D3-6 Do you perform tasks on zener diode power supply voltage regulators	51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C
D 305	D3-7 Do you perform tasks on transistor series power supply voltage regulators	67	57	53	46	64	63	35	41	9	10	9	47	26	30
D 306	D3-8 Do you perform tasks on IC power supply voltage regulators	65	58	40	48	59	62	23	37	6	8	7	40	25	28
D 307	D3-9 Do you perform tasks on pulse width modulator power supply voltage regulators	45	27	35	30	33	43	17	26	5	5	5	21	16	16
D 308	D3-10 Do you perform tasks on transistor series power supply voltage regulators with current limiting	48	26	27	11	19	14	10	13	2	3	5	18	15	15
D 309	D3-11 Do you perform tasks on crow bar power supply voltage regulators	55	43	32	29	41	43	17	24	4	5	3	24	18	15
		59	20	18	13	23	25	26	21	2	4	1	3	7	3

## 0024 V. Reactive Circuits

## 0025 V 1. E1 Resistive Capacitive Inductive Circuits

E 310	E1-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	69	56	48	46	68	60	31	29	20	22	16	49	28	38
E 311	E1-2 Do you troubleshoot RCL circuits to circuit level components	59	50	42	40	57	54	18	24	11	9	9	44	19	21
E 312	E1-3 Do you trace schematic or block diagrams of circuits containing resonant RCL circuits	64	49	39	37	63	54	25	22	14	14	10	41	26	33
E 313	E1-4 Do you troubleshoot resonant RCL circuits to circuit level components	54	44	34	31	53	50	14	18	8	7	7	35	18	20
E 314	E1-5 Do you calculate values of impedance, voltage, or current in RCL circuits	23	26	22	13	22	22	11	9	5	5	5	13	8	11
E 315	E1-6 Do you calculate phase angle of RCL circuits	14	14	15	8	15	13	7	6	3	4	2	8	4	5
E 316	E1-7 Do you calculate values of power in RCL circuits	17	17	16	10	18	16	8	7	3	3	4	8	4	9

## 0026 V 2. E2 Frequency Sensitive Filters

E 317	E2-1 Do you trace schematic or block diagrams of circuits containing frequency sensitive filters	64	52	41	50	59	64	45	16	9	12	8	46	32	36
E 318	E2-2 Do you troubleshoot circuits to isolate a faulty frequency sensitive filter	59	48	38	45	54	60	39	15	7	5	6	42	30	25
E 319	E2-3 Do you troubleshoot frequency sensitive filters to circuit level components	44	42	33	35	44	49	18	11	3	2	3	36	17	18
E 320	E2-4 Do you align or adjust frequency sensitive filters	54	45	33	35	51	49	24	10	5	1	2	31	15	18
E 321	E2-5 Do you calculate capacitance or inductance values for specific frequency sensitive filters	19	19	18	13	17	23	8	5	2	1	1	8	5	5
E 322	E2-6 Do you perform tasks on low pass frequency sensitive filters	57	46	35	48	58	59	34	16	10	8	5	41	27	2

D	T Task	Task Title	303	303	303	304	304	304	304	305	455	455	455	455	455	455
Y Nbr			51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C
E 323	E2-7	Do you perform tasks on high pass frequency sensitive filters	56	42	33	47	59	55	33	15	9	8	5	40	24	21
E 324	E2-8	Do you perform tasks on band pass frequency sensitive filters	68	51	44	55	66	63	46	13	10	6	3	48	32	30
E 325	E2-9	Do you perform tasks on band-reject frequency sensitive filters	45	29	25	45	44	42	32	7	4	2	3	30	16	14
E 326	E2-10	Do you perform tasks on ferrite bead frequency sensitive filters	19	9	10	11	25	29	8	3	2	1	1	7	6	6

#### 0027 VI. Waveshaping/Generating Circuits

#### 0028 VI 1. Fl Oscillators

F 327	F1-1	Do you trace block diagrams of circuits containing oscillators	86	74	69	66	84	71	56	51	12	11	10	60	38	53
F 328	F1-2	Do you trace schematic diagrams of oscillator circuits	83	75	69	60	84	69	45	47	11	8	7	56	34	43
F 329	F1-3	Do you troubleshoot to isolate a faulty oscillator circuit	81	73	68	59	78	68	48	46	11	4	6	53	32	30
F 330	F1-4	Do you troubleshoot oscillators to circuit level components	64	65	61	47	71	60	19	36	7	2	2	39	25	24
F 331	F1-5	Do you align or adjust oscillator circuits	81	67	61	60	80	64	48	39	5	4	5	49	30	34
F 332	F1-6	Do the oscillators you work with use LC tank circuits	65	52	47	33	65	57	21	22	8	7	5	51	30	29
F 333	F1-7	Do the oscillators you work with use RC networks	59	54	51	35	66	54	16	27	8	7	5	52	30	28
F 334	F1-8	Do the oscillators you work with use crystals	85	73	64	62	82	62	45	42	9	5	3	57	39	36
F 335	F1-9	Do the oscillators you work with use phase lock loops (PLL)	47	20	20	45	35	60	50	21	1	1	2	18	17	15
F 336	F1-10	Do you perform tasks on series Hartley oscillator circuits	51	45	23	18	55	42	10	17	3	3	3	36	19	20
F 337	F1-11	Do you perform tasks on shunt Hartley oscillator circuits	46	33	16	18	23	37	8	15	4	2	3	33	16	17
F 338	F1-12	Do you perform tasks on Colpitts oscillator circuits	33	24	10	19	60	39	7	12	2	1	1	30	21	22
F 339	F1-13	Do you perform tasks on Clapp oscillator circuits	22	6	6	12	10	14	5	3	0	1	1	7	5	2
F 340	F1-14	Do you perform tasks on voltage control oscillators (VCO/VTD)	61	27	27	50	29	51	44	19	1	1	2	39	22	22
F 341	F1-15	Do you perform tasks on crystal oscillator circuits	78	66	50	57	75	55	41	36	8	4	3	49	26	32
F 342	F1-16	Do you perform tasks on Wien bridge oscillator circuits	21	8	7	9	15	25	5	3	0	1	1	11	9	10
F 343	F1-17	Do you perform tasks on pulse generating oscillator circuits	41	29	30	18	29	21	15	17	1	4	4	30	18	11
F 344	F1-18	Do you perform tasks on blocked/blocking oscillator circuits	35	39	35	10	19	12	5	6	1	2	1	18	14	10
F 345	F1-19	Do you perform tasks on burst generators	12	4	6	7	39	9	6	3	0	1	1	9	8	8
F 346	F1-20	Do you perform tasks on RC phase shift oscillators	31	20	17	13	40	23	13	8	1	1	2	23	11	11

D  
T Task  
Y Nbr

Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

## 0029 VI 2. F2 Multivibrators

F 347 F2-1 Do you trace block diagrams of circuits containing multivibrators

F 348 F2-2 Do you trace schematic diagrams of multivibrator circuits

F 349 F2-3 Do you troubleshoot to isolate a faulty multivibrator circuit

F 350 F2-4 Do you troubleshoot multivibrators to circuit level components

F 351 F2-5 Do you adjust or align multivibrator circuits

F 352 F2-6 Do the multivibrators you work with use LC tank circuits

F 353 F2-7 Do the multivibrators you work with use RC networks

F 354 F2-8 Do the multivibrators you work with use Crystals

F 355 F2-9 Do you perform tasks on astable (free running) multivibrators

F 356 F2-10 Do you perform tasks on monostable (one shot) multivibrators

F 357 F2-11 Do you perform tasks on bistable (flip flop) multivibrators

F 358 F2-12 Do you perform tasks on triggered astable multivibrators

79 70 68 40 79 44 25 44 13 16 12 47 28 31

77 69 67 38 77 43 20 42 10 11 9 44 24 28

71 66 63 33 71 41 18 40 9 7 6 43 22 20

60 59 58 28 60 35 11 33 7 4 2 31 18 13

68 51 57 29 65 33 13 28 6 1 4 34 18 18

60 45 41 27 59 37 13 18 5 9 6 38 22 23

60 53 52 29 65 39 12 29 7 10 6 41 24 24

70 58 44 33 62 30 17 30 7 4 4 40 23 23

66 53 56 30 56 38 12 34 8 8 5 37 22 26

71 63 55 29 68 38 14 39 6 10 5 37 22 21

74 60 54 35 67 40 19 41 10 11 6 41 24 24

60 42 44 24 43 30 9 27 5 5 3 29 16 20

## 0030 VI 3. F3 Waveshaping Circuits

F 359 F3-1 Do you trace block diagrams of circuits containing waveshaping circuits (WSC)

F 360 F3-2 Do you trace schematic diagrams of WSC

F 361 F3-3 Do you troubleshoot to isolate a faulty WSC

F 362 F3-4 Do you troubleshoot WSC to circuit level components

F 363 F3-5 Do you adjust or calibrate WSC

F 364 F3-6 Do you perform tasks on sawtooth wave generator WSC

F 365 F3-7 Do you perform tasks on trapezoidal (ramp) wave generator WSC

F 366 F3-8 Do you perform tasks on RC differentiating WSC

F 367 F3-9 Do you perform tasks on RL differentiating WSC

F 368 F3-10 Do you perform tasks on RC integrating WSC

F 369 F3-11 Do you perform tasks on RL integrating WSC

F 370 F3-12 Do you perform tasks on square wave generator WSC

F 371 F3-13 Do you perform tasks on rectangular wave generator WSC

F 372 F3-14 Do you perform tasks on Schmitt trigger WSC

75 70 60 32 70 37 22 34 8 12 6 39 28 36

73 69 60 28 70 35 17 31 7 9 5 36 24 29

69 67 56 25 64 33 16 29 6 7 7 34 19 22

55 63 51 23 55 28 9 24 3 5 3 26 17 15

66 58 49 21 59 28 15 27 3 4 3 30 18 20

74 63 53 20 39 27 18 19 4 7 3 33 19 23

62 40 41 10 28 16 9 11 0 1 2 27 14 23

51 42 36 14 49 20 9 14 0 4 3 17 16 9

37 26 23 10 32 17 7 10 0 3 3 14 11 10

43 29 31 12 31 17 8 14 0 5 2 13 11 7

33 21 20 9 25 16 7 9 0 4 2 13 9 8

62 53 48 27 54 29 19 27 4 10 3 31 21 23

40 30 35 11 33 16 8 15 2 3 2 19 13 16

63 49 41 28 65 30 17 27 4 7 3 23 16 16

D  
 T Task  
 Y Mbr

303 303 303 304 304 304 304 305 455 455 455 455 455 455 455  
 51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

Task Title

0031 VI 4. F4 Limiter/Clamper Circuits

F 373 F4-1 Do you trace block diagrams of circuits containing  
 limiters 76 63 53 37 58 53 24 34 7 17 6 40 25 32  
 F 374 F4-2 Do you trace schematic diagrams of limiter circuits 74 63 51 35 58 52 19 30 4 13 3 37 22 23  
 F 375 F4-3 Do you trace block diagrams of circuits containing  
 clammers 65 60 48 29 56 43 17 29 2 10 3 32 19 16  
 F 376 F4-4 Do you trace schematic diagrams of clamper circuits 64 59 47 27 54 42 16 28 2 9 2 28 18 15  
 F 377 F4-5 Do you troubleshoot to isolate a faulty limiter circuit 65 58 47 33 51 48 17 27 3 8 3 31 18 16  
 F 378 F4-6 Do you troubleshoot limiters to circuit level 56 57 42 28 45 41 12 24 2 5 1 24 18 14  
 components  
 F 379 F4-7 Do you troubleshoot to isolate a faulty clamper circuit 59 58 44 25 47 40 14 26 1 6 1 25 15 13  
 F 380 F4-8 Do you troubleshoot clammers to circuit level 52 55 42 23 43 35 11 23 1 4 1 19 14 10  
 components  
 F 381 F4-9 Do you perform tasks on series diode limiter circuits 56 41 31 23 40 44 16 24 3 5 2 29 18 14  
 F 382 F4-10 Do you perform tasks on shunt diode limiter circuits 53 50 30 21 33 43 13 23 3 5 2 29 17 15  
 F 383 F4-11 Do you perform tasks on bias limiter circuits 46 37 23 20 26 31 11 16 1 4 1 18 12 11  
 F 384 F4-12 Do you perform tasks on zener diode circuits 66 49 43 30 49 44 18 28 3 10 2 34 20 17  
 F 385 F4-13 Do you perform tasks on transistor limiter circuits 53 44 25 23 35 39 11 19 2 5 2 26 16 13  
 F 386 F4-14 Do you perform tasks on triode limiter circuits 21 24 18 7 19 17 7 6 0 2 1 15 11 5  
 F 387 F4-15 Do you perform tasks on diode clamper circuits 55 49 34 21 43 36 14 24 1 5 2 22 12 10  
 F 388 F4-16 Do you perform tasks on bias clamper circuits 44 42 22 13 29 23 9 15 1 3 2 15 7 6

0032 VII. Computers, Digital Circuits, and Devices

0033 VII 1. G1 Digital Logic Numbering Systems and Functions

G 389 G1-1 Do you convert decimal numbers to binary numbers or  
 binary numbers to decimal 71 38 34 24 35 25 27 57 20 18 17 31 21 18  
 G 390 G1-2 Do you convert octal numbers to binary or binary  
 numbers to octal 55 29 34 18 20 12 17 49 20 15 13 17 15 7  
 G 391 G1-3 Do you convert hexadecimal numbers to binary or  
 binary numbers to hexadecimal 62 19 25 16 20 10 20 52 16 13 10 15 9 3  
 G 392 G1-4 Do you convert octal numbers to decimal or decimal  
 numbers to octal 52 28 33 18 17 10 17 46 19 15 16 15 13 5  
 G 393 G1-5 Do you convert hexadecimal numbers to decimal or  
 decimal numbers to hexadecimal 63 19 23 15 22 10 17 50 16 12 9 12 9 3  
 G 394 G1-6 Do you convert octal numbers to hexadecimal or  
 hexadecimal numbers to octal 44 19 22 13 16 8 14 38 15 12 10 10 8 3  
 G 395 G1-7 Do you convert base number fractions to another base  
 numbering system 35 19 20 10 16 9 14 22 8 12 8 10 11 3  
 G 396 G1-8 Do you add binary numbers 56 36 28 19 26 20 21 43 15 15 10 22 16 9



D T Tsk Y Nbr	Task Title	303 51	303 52	303 53	304 50	304 51	304 54	304 56	305 54	455 X1A	455 X1B	455 X1C	455 X2A	455 X2B	455 X2C
G 397	G1-9 Do you subtract binary numbers	54	36	27	18	26	20	17	39	13	14	10	20	14	6
G 398	G1-10 Do you multiply binary numbers	31	28	19	13	19	14	13	23	9	12	6	13	9	2
G 399	G1-11 Do you divide binary numbers	28	27	18	13	16	14	12	22	9	12	6	13	9	2
G 400	G1-12 Do you add octal numbers	36	27	24	14	15	7	10	36	13	12	7	10	7	3
G 401	G1-13 Do you subtract octal numbers	36	26	24	14	14	7	9	33	12	11	8	10	6	3
G 402	G1-14 Do you add hexadecimal numbers	42	17	15	13	18	9	12	34	10	11	5	8	5	2
G 403	G1-15 Do you subtract hexadecimal numbers	40	17	15	13	17	9	11	32	9	10	5	9	5	2
G 404	G1-16 Do you use binary coded decimal (BCD)	66	45	30	21	31	28	26	34	14	14	10	27	20	15
G 405	G1-17 Do you use gray codes	51	43	17	7	9	5	9	19	3	4	2	5	3	2
G 406	G1-18 Do you use ICAO codes	33	4	5	2	4	1	2	3	0	1	1	3	1	0
G 407	G1-19 Do you use excess-3 (XS3) codes	9	7	5	4	3	2	4	6	4	4	2	3	3	0
G 408	G1-20 Do you use parity bit codes	54	17	15	18	9	16	12	31	7	7	5	10	7	5
G 409	G1-21 Do you use biquinary codes	6	4	5	4	2	1	5	4	0	2	2	2	3	1
G 410	G1-22 Do you use ASCII codes	26	6	19	6	8	15	28	56	2	4	3	4	7	1
G 411	G1-23 Do you use EBCDI codes	4	4	4	2	3	2	3	7	0	1	1	2	1	0
G 412	G1-24 Do you trace data flow through logic symbol diagrams	76	50	45	36	56	36	31	72	20	21	12	38	25	23
G 413	G1-25 Do you trace data flow through logic schematic diagrams	74	51	44	35	51	35	30	72	21	19	13	34	22	21
G 414	G1-26 Do you troubleshoot digital systems to major units	76	47	44	38	50	37	36	72	20	22	18	38	28	22
G 415	G1-27 Do you troubleshoot digital systems subassemblies or circuit cards	74	45	44	36	46	33	30	71	16	15	11	32	20	16
G 416	G1-28 Do you troubleshoot digital systems, subsystems or circuit cards to circuit level components or IC	55	43	37	27	33	25	15	56	9	9	5	19	9	8
G 417	G1-29 Do you trace data flow through circuits using positive logic (High = Binary 1)	69	46	40	28	46	31	20	64	12	12	9	21	16	14
G 418	G1-30 Do you trace data flow through circuits using negative logic (High = Binary 0)	59	38	32	22	35	24	17	51	10	11	7	19	13	13
G 419	G1-31 Do you perform tasks related to AND gates	76	51	48	35	64	40	28	68	20	21	12	38	23	23
G 420	G1-32 Do you perform tasks related to OR gates	76	50	48	35	64	40	28	67	20	21	12	37	23	23
G 421	G1-33 Do you perform tasks related to inhibited gates logic functions	59	36	34	31	48	24	21	50	10	9	7	29	19	18
G 422	G1-34 Do you perform tasks related to NAND or NOR gates	74	47	47	34	62	37	26	65	20	19	11	32	21	20
G 423	G1-35 Do you perform tasks related to exclusive OR/NOR logic functions	69	43	45	30	55	33	25	60	17	14	9	24	19	14
G 424	G1-36 Do you perform tasks related to RS flip flops	50	32	39	23	27	22	17	51	9	7	7	18	11	7
G 425	G1-37 Do you perform tasks related to D(Data) flip flops	67	30	38	24	35	21	17	54	8	11	7	18	9	6
G 426	G1-38 Do you perform tasks related to T(Toggle) flip flops	67	37	41	25	50	24	16	56	10	10	6	14	9	6
G 427	G1-39 Do you perform tasks related to JK flip flops	71	45	39	25	50	25	18	57	7	11	5	13	12	5
G 428	G1-40 Do you perform tasks related to Schmidt triggers	63	36	37	22	54	29	18	46	9	9	6	19	12	11
G 429	G1-41 Do you perform tasks related to delay (One-shot) logic functions	63	36	36	19	42	23	13	53	7	8	5	17	11	9
G 430	G1-42 Do you perform tasks related to open collector gates (wired "AND" or wired "OR")	45	23	27	14	19	11	9	38	9	7	5	9	5	3
G 431	G1-43 Do you perform tasks related to buffers	63	37	39	26	52	27	19	53	12	11	7	22	18	8
G 432	G1-44 Do you perform tasks related to inverters	70	45	44	29	56	30	23	62	13	14	7	26	18	14
G 433	G1-45 Do you perform tasks related to complemented flip flops	49	28	27	15	32	13	10	35	8	5	5	13	7	8
G 434	G1-46 Do you perform tasks related to complementing flip flops	48	28	28	14	32	13	10	34	7	5	5	13	7	8



D	Tsk	Task Title	303	303	303	304	304	304	304	305	455	455	455	455	455	455
Y	Nbr		51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C
G 468		G2-22 Do you perform tasks on paper (tape, punch card) computer memories	41	5	6	1	5	6	6	35	10	5	5	4	2	0
G 469		G2-23 Do you perform tasks on advanced technology (bubble, CCD, electron beam, laser, thin film) computer memories	4	4	3	0	2	2	2	6	5	2	2	2	1	0
G 470		G2-24 Do you perform tasks on computer keyboards	50	13	38	8	23	21	34	82	15	11	20	9	11	3
G 471		G2-25 Do you perform tasks on computer character printers	22	8	19	8	16	12	24	63	8	3	5	6	7	1
G 472		G2-26 Do you perform tasks on magnetic tape drives	26	7	20	1	3	10	15	69	8	4	6	4	3	2
G 473		G2-27 Do you perform tasks on microprocessor computer terminals	18	6	13	2	8	11	11	52	4	3	7	3	3	1
G 474		G2-28 Do you perform tasks on video display unit (VDU/monitors)	27	8	23	5	13	11	18	74	10	6	13	4	3	1
G 475		G2-29 Do you perform tasks on paper tape readers/punches	38	4	4	2	5	5	8	25	7	3	5	3	3	1
G 476		G2-30 Do you perform tasks on paper card readers/punches	7	4	3	0	2	2	2	28	1	2	2	2	0	0
G 477		G2-31 Do you perform tasks on toggle or push button switch inputs	58	9	21	5	5	9	13	60	11	10	12	7	7	3
G 478		G2-32 Do you perform tasks on incandescent displays (Nixie tubes, LEDs, LCDs)	40	12	15	7	8	13	15	49	6	7	12	8	8	0
G 479		G2-33 Do you perform tasks on modems	31	6	5	5	15	14	22	47	2	1	2	3	7	0
G 480		G2-34 Do you perform tasks on line printers	20	9	27	4	13	11	13	75	4	4	3	4	7	2
G 481		G2-35 Do you perform tasks on floppy disc drives	8	6	28	5	8	13	13	51	2	3	5	3	2	1
G 482		G2-36 Do you perform tasks on removable cartridge disc drives	6	5	8	0	3	5	5	30	2	1	3	2	1	0
G 483		G2-37 Do you perform tasks on removable pack disc drives	7	4	6	0	1	3	3	35	1	1	1	2	0	0
G 484		G2-38 Do you perform tasks on fixed winchester type disc drives	4	6	3	1	4	8	7	24	1	1	2	2	0	0
G 485		G2-39 Do you trace block or schematic diagrams of microprocessor controlled systems	38	7	18	8	11	17	16	52	7	9	9	6	9	2
G 486		G2-40 Do you troubleshoot microprocessor controlled systems to a subassembly or circuit card	38	7	16	7	11	15	14	52	7	8	7	6	5	1
G 487		G2-41 Do you troubleshoot microprocessor controlled systems to isolate a faulty microprocessor	27	6	11	5	9	11	9	40	3	7	2	4	2	1
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0035		VII 3. G3 Digital Circuits														
G 488		G3-1 Do you trace data flow through circuits containing counters	63	45	38	26	49	28	18	49	12	8	6	26	18	16
G 489		G3-2 Do you troubleshoot counter circuits to isolate a faulty counter	55	44	34	24	48	25	14	45	8	6	5	21	11	13
G 490		G3-3 Do you troubleshoot counters to circuit level components	40	40	27	22	39	20	9	38	6	5	2	16	7	9
G 491		G3-4 Do you perform tasks on UP counters in logic circuits	57	47	32	22	46	25	13	44	6	5	5	23	15	15
G 492		G3-5 Do you perform tasks on DOWN counters in logic circuits	54	45	28	19	39	24	12	40	5	5	5	18	13	14
G 493		G3-6 Do you perform tasks on DECADE counters in logic circuits	38	35	22	15	44	14	8	15	4	4	3	8	3	6
G 494		G3-7 Do you perform tasks on ring counters in logic circuits	34	15	10	7	19	10	5	26	1	4	2	3	3	3

PRTMOD	Keesler TTC AFSCs (Inventory Order - 1 of 2)	PH0025	Occupational Analysis Program USAFOMC (ATC) Randolph AFB TX	Page 22
D				
T Tsk				
Y Nbr				
	Task Title			
G 495	G3-8 Do you perform tasks on modulus counters in logic circuits	10 10 9 5 11 4 3 19 0 2 2 2 2 0		
G 496	G3-9 Do you perform tasks on synchronous (parallel) counters in logic circuits	45 32 23 14 26 14 10 31 2 5 3 7 9 5		
G 497	G3-10 Do you perform tasks on asynchronous (serial) counters in logic circuits	42 32 23 17 29 16 11 32 3 5 2 9 8 6		
G 498	G3-11 Do you trace logic diagrams of circuits containing registers	59 41 27 23 23 20 14 53 6 7 7 11 9 9		
G 499	G3-12 Do you troubleshoot circuits containing registers to isolate a faulty register	51 40 24 20 19 17 9 47 5 5 5 10 4 2		
G 500	G3-13 Do you troubleshoot registers to circuit level components	37 33 19 15 17 12 8 40 3 4 3 7 2 0		
G 501	G3-14 Do you perform tasks on shift registers in logic circuits	63 40 28 21 21 20 13 47 4 7 5 11 6 6		
G 502	G3-15 Do you perform tasks on storage registers in logic circuits	60 38 28 20 24 18 11 48 3 7 5 9 5 3		
G 503	G3-16 Do you trace data flow through combinational logic circuits	56 37 20 21 25 15 21 45 7 9 5 13 9 9		
G 504	G3-17 Do you troubleshoot to isolate a faulty combinational logic circuit	51 36 19 20 23 14 20 42 6 6 3 12 7 6		
G 505	G3-18 Do you troubleshoot combinational logic circuits to circuit level components	35 32 16 15 19 11 11 35 3 2 2 7 6 6		
G 506	G3-19 Do you perform tasks on encoders	62 39 27 27 29 15 36 42 7 11 8 20 11 14		
G 507	G3-20 Do you perform tasks on decoders	58 43 28 27 30 16 36 43 4 8 6 20 11 14		
G 508	G3-21 Do you perform tasks on multiplexers	64 32 22 26 26 13 36 40 7 9 5 9 7 2		
G 509	G3-22 Do you perform tasks on demultiplexers	64 17 15 25 12 10 35 26 0 7 3 2 5 1		
G 510	G3-23 Do you perform tasks on comparators	53 41 24 22 32 12 19 41 6 9 4 12 7 7		
G 511	G3-24 Do you perform tasks on parity generators or checkers	58 29 13 19 12 9 11 44 4 7 2 7 4 3		
G 512	G3-25 Do you perform tasks on code converters	40 22 10 13 9 7 9 24 2 6 3 7 5 3		
G 513	G3-26 Do you perform tasks on adders	53 36 17 12 20 10 8 31 3 8 4 6 3 3		
G 514	G3-27 Do you perform tasks on subtractors	49 33 16 9 17 9 7 26 3 7 3 6 3 2		
G 515	G3-28 Do you perform tasks on count detect circuits	33 15 11 12 18 7 7 23 2 4 2 4 2 0		

#### 0036 VII 4. G4 Digital to Analog (D/A) and Analog to Digital (A/Converters

G 516	G4-1 Do you trace data flow through A/D converters	73 47 37 20 36 23 33 33 8 14 12 20 15 13
G 517	G4-2 Do you trace data flow through D/A converters	73 45 34 18 32 24 33 37 8 14 11 25 18 21
G 518	G4-3 Do you troubleshoot A/D converter circuits	72 41 30 17 34 21 31 30 8 10 9 15 10 8
G 519	G4-4 Do you troubleshoot D/A converter circuits	71 40 28 16 30 22 29 33 8 9 9 21 12 16
G 520	G4-5 Do the converters you perform tasks on use flash conversion	5 4 3 2 2 1 5 3 1 0 1 1 1 0
G 521	G4-6 Do the converters you perform tasks on use successive approximation conversion	16 12 9 4 6 5 8 6 2 4 1 3 4 3
G 522	G4-7 Do the converters you perform tasks on use ramp conversion	33 25 10 3 18 5 7 12 1 2 1 2 7 6
G 523	G4-8 Do the converters you perform tasks on use R2R conversion	12 5 3 2 4 1 4 2 0 1 1 2 1 0

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Task Title

303 303 303 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0037 VIII. Transmission/Reception Circuits, Devices, and Systems

0038 VIII 1. H1 Connections

H 524	H1-1 Do you measure electrical length on transmission lines	36	12	11	10	72	36	9	4	2	2	2	2	32	22	28
H 525	H1-2 Do you measure physical length on transmission lines	40	27	19	19	63	44	17	7	3	2	2	2	45	30	45
H 526	H1-3 Do you measure standing wave ratio (SWR) on transmission lines	64	53	31	25	77	60	31	2	1	2	1	2	57	60	63
H 527	H1-4 Do you construct transmission lines	27	33	19	23	49	46	17	6	2	1	2	48	35	48	
H 528	H1-5 Do you match transmission line impedance with loads	38	24	19	22	58	49	17	6	0	1	1	27	18	29	
H 529	H1-6 Do you calculate the characteristic impedance (Z0) of transmission lines	15	10	9	11	30	24	7	2	0	1	0	10	7	13	
H 530	H1-7 Do you troubleshoot transmission lines	60	37	31	30	69	59	28	16	2	3	4	58	54	61	
H 531	H1-8 Do you perform tasks on open-wire transmission lines	22	12	10	15	20	26	9	6	4	4	3	18	18	18	
H 532	H1-9 Do you perform tasks on twisted pair transmission lines	41	14	17	30	23	29	19	17	2	4	3	16	28	22	
H 533	H1-10 Do you perform tasks on twin lead transmission lines	24	11	10	20	23	28	15	5	1	4	2	11	10	13	
H 534	H1-11 Do you perform tasks on flexible coaxial transmission lines	72	55	49	45	72	69	48	15	10	7	7	67	62	69	
H 535	H1-12 Do you perform tasks on rigid coaxial transmission lines	63	43	40	30	57	35	32	5	2	2	1	42	24	31	
H 536	H1-13 Do you perform tasks on fiber-optic transmission lines	5	7	2	6	5	14	8	8	0	1	1	2	1	1	
H 537	H1-14 Do you trace schematic or block diagrams of circuits containing waveguides	88	67	74	48	8	5	59	2	8	5	5	41	35	33	
H 538	H1-15 Do you troubleshoot circuits to isolate a faulty waveguide assembly	83	63	70	45	6	5	56	1	7	4	4	44	30	30	
H 539	H1-16 Do you pressurize or purge waveguide assemblies	67	68	64	27	4	3	47	1	2	2	3	37	30	24	
H 540	H1-17 Do you measure standing wave ratio for waveguide assemblies	83	68	47	27	5	3	34	1	1	1	2	30	25	16	
H 541	H1-18 Do you remove or install waveguide or associated coupling hardware components	86	69	73	43	5	5	56	1	4	4	4	44	34	30	

0039 VIII 2. H2 Microwave Oscillators and Amplifiers

H 542	H2-1 Do you trace schematic or block diagrams of circuits containing microwave oscillators or amplifiers	65	50	58	55	14	2	42	1	2	2	4	32	20	22
H 543	H2-2 Do you troubleshoot circuits to isolate a faulty microwave oscillator or amplifier	62	47	55	53	13	2	41	1	2	1	4	31	16	16
H 544	H2-3 Do you tune or adjust microwave oscillators or amplifiers	60	47	55	54	14	1	42	1	2	1	3	30	14	15
H 545	H2-4 Do you perform tasks on two-cavity klystron microwave oscillators and amplifiers	8	6	8	10	1	0	13	0	0	1	2	9	9	9

D	T	Task Title	303	303	303	304	304	304	304	305	455	455	455	455	455	455
Y	Nbr		51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C
H	546	H2-5 Do you perform tasks on three-cavity klystron microwave oscillators and amplifiers	4	34	6	20	33	0	17	0	0	1	1	3	1	7
H	547	H2-6 Do you perform tasks on reflex klystron microwave oscillators and amplifiers	22	13	30	15	2	0	4	0	3	2	2	17	7	9
H	548	H2-7 Do you perform tasks on travelling wave tube microwave oscillators and amplifiers	41	30	27	36	0	0	41	1	0	0	1	3	2	1
H	549	H2-8 Do you perform tasks on magnetron microwave oscillators and amplifiers	76	30	65	4	4	0	5	0	1	1	4	33	21	16
H	550	H2-9 Do you perform tasks on backward wave oscillator	3	9	13	4	0	0	3	0	0	0	0	0	0	2
H	551	H2-10 Do you perform tasks on parametric amplifiers	58	9	12	12	0	0	42	0	0	0	1	0	1	1
H	552	H2-11 Do you perform tasks on yttrium iron garnet (YIG) tuned microwave oscillators and amplifiers	2	27	19	3	2	1	7	0	0	0	0	1	0	2

#### 0040 VIII 3. H3 Resonant Cavities

H	553	H3-1 Do you trace schematic or block diagrams of circuits containing resonant cavities	62	53	46	27	53	29	25	1	1	0	2	34	23	26
H	554	H3-2 Do you troubleshoot circuits to isolate a faulty resonant cavity	53	51	44	23	46	28	17	1	1	0	1	32	22	20
H	555	H3-3 Do you tune or adjust resonant cavities electrically	47	42	41	19	44	25	17	1	1	0	1	25	16	20
H	556	H3-4 Do you tune or adjust resonant cavities physically	58	52	45	29	54	27	25	1	1	0	1	29	18	17
H	557	H3-5 Do you measure frequency of resonant cavities	53	44	46	17	41	22	14	1	1	0	1	27	18	20
H	558	H3-6 Do you perform tasks on probe resonant cavities	27	40	22	13	27	8	12	0	0	0	1	26	15	17
H	559	H3-7 Do you perform tasks on loop resonant cavities	22	37	14	9	20	8	7	0	1	0	1	16	8	5
H	560	H3-8 Do you perform tasks on aperture (iris/window) resonant cavities	18	32	10	4	8	6	10	0	0	0	0	11	9	5

#### 0041 VIII 4. H4 Transmitters and Receivers

H	561	H4-1 Do you use "AM" modulation principles	41	14	18	11	59	59	14	2	0	1	2	47	48	49
H	562	H4-2 Do you trace block diagrams of AM transmitters	35	14	18	10	67	66	14	2	1	1	1	44	45	53
H	563	H4-3 Do you trace block diagrams of AM transmitter subassemblies or circuit cards	33	13	16	9	65	65	13	2	1	1	0	40	31	40
H	564	H4-4 Do you trace schematic diagrams of AM transmitter subassemblies or circuit cards	32	13	16	9	67	63	11	2	1	1	0	36	29	29
H	565	H4-5 Do you troubleshoot AM transmitters to major units	27	12	16	8	65	65	12	2	1	1	1	45	44	51
H	566	H4-6 Do you troubleshoot AM transmitters to subassemblies or circuit cards	30	12	13	8	65	64	12	2	1	0	0	37	28	31
H	567	H4-7 Do you troubleshoot AM transmitter subassemblies or circuit cards to circuit level components	19	12	13	6	58	59	7	2	1	0	0	28	17	15
H	568	H4-8 Do you align or adjust AM transmitters or circuits	35	12	14	9	65	64	10	2	1	0	0	38	27	34
H	569	H4-9 Do you calculate percentage of modulation for AM transmitters	24	9	10	6	66	59	8	1	0	0	0	34	26	32
H	570	H4-10 Do you use "AM" demodulation principles	34	8	12	9	33	64	11	3	0	1	2	45	34	43
H	571	H4-11 Do you trace block diagrams of AM receivers	31	12	14	8	36	73	12	3	1	1	1	58	45	5



D T Y	Tsk Nbr	Task Title
H 604	H 605	H4-44 Do you trace block diagrams of FM receivers
H 604	H 605	H4-45 Do you trace block diagrams of FM receiver subassemblies or circuit cards
H 606	H 607	H4-46 Do you trace schematic diagrams of FM receiver subassemblies or circuit cards
H 607	H 608	H4-47 Do you troubleshoot FM receivers to major units
H 608	H 609	H4-48 Do you troubleshoot FM receivers to subassemblies or circuit cards
H 609	H 610	H4-49 Do you troubleshoot FM receiver subassemblies or circuit cards to circuit level components
H 610	H 611	H4-50 Do you align or adjust FM receivers or circuits
H 611	H 612	H4-51 Do you plot receiver signal level curves (RSL) for FM receivers
H 612	H 613	H4-52 Do you use "PM" modulation principles
H 613	H 614	H4-53 Do you trace block diagrams of PM transmitters
H 614	H 615	H4-54 Do you trace block diagrams of PM transmitter subassemblies or circuit cards
H 615	H 616	H4-55 Do you trace schematic diagrams of PM transmitter subassemblies or circuit cards
H 616	H 617	H4-56 Do you troubleshoot PM transmitters to major units
H 617	H 618	H4-57 Do you troubleshoot PM transmitters to sub-assemblies or circuit cards
H 618	H 619	H4-58 Do you troubleshoot PM transmitter subassemblies or circuit cards to circuit level components
H 619	H 620	H4-59 Do you align or adjust PM transmitters or circuits
H 620	H 621	H4-60 Do you calculate pulse recurrence time (PRT) or pulse recurrence frequency (PRF) for PH transmitters
H 621	H 622	H4-61 Do you measure PRT, PRF or pulse width for PH transmitters
H 622	M 623	H4-62 Do you use "PM" demodulation principles
M 623	H 624	H4-63 Do you trace block diagrams of PM receivers
H 624	H 625	H4-64 Do you trace block diagrams of PH receiver subassemblies or circuit cards
H 625	H 626	H4-65 Do you trace schematic diagrams of PH receiver subassemblies or circuit cards
H 626	H 627	H4-66 Do you troubleshoot PM receivers to major units
H 627	H 628	H4-67 Do you troubleshoot PM receivers to subassemblies or circuit cards
H 628	H 629	H4-68 Do you troubleshoot PH receiver subassemblies or circuit cards to circuit level components
H 629		H4-69 Do you align or adjust PH receivers or circuits

## 0042 VIII 5. H5 Antennas

H 630	H5-1	Do you physically align antennas	79	61	68	33	68	45	52	2	6	2	8	50	27	34
H 631	H5-2	Do you electrically align antennas	58	51	61	16	62	32	42	1	4	2	4	42	23	26
H 632	H5-3	Do you troubleshoot loading of antennas	37	27	25	13	50	43	17	0	1	1	3	41	33	40
H 633	H5-4	Do you troubleshoot coupling of antennas	54	38	37	16	56	46	24	1	3	2	5	52	35	48



D	T Y Nbr	Task Title
H 634	M 639	H5-5 Do you plot graph radiation patterns
H 635	M 638	H5-6 Do you troubleshoot antenna components
H 636	M 637	H5-7 Do you measure standing wave ratio (SWR) for antennas
H 637	M 636	H5-8 Do you work with Vagi antennas
H 638	M 635	H5-9 Do you work with dipole antennas
H 639	M 634	H5-10 Do you work with slotted antennas
H 640	M 633	H5-11 Do you work with rotary antennas
H 641	M 632	H5-12 Do you work with hertz antennas
H 642	M 631	H5-13 Do you work with marconi antennas
H 643	M 630	H5-14 Do you work with rhombic antennas
H 644	M 629	H5-15 Do you work with scimitar antennas
H 645	M 628	H5-16 Do you work with parabolic antennas
H 646	M 627	H5-17 Do you work with ground plane antennas
H 647	M 626	H5-18 Do you perform tasks on rotary antenna arrays
H 648	M 625	H5-19 Do you perform tasks on stacked (end fire) antenna arrays
H 649	M 624	H5-20 Do you perform tasks on broadside antenna arrays
H 650	M 623	H5-21 Do you perform tasks on cardioid antenna arrays
H 651	M 622	H5-22 Do you perform tasks on collinear antenna arrays
H 652	M 621	H5-23 Do you perform tasks on phase antenna arrays
H 653	M 620	H5-24 Do you perform tasks on planar antenna arrays
H 654	M 619	H5-25 Do you perform tasks on antennas with vertical polarization
H 655	M 618	H5-26 Do you perform tasks on antennas with horizontal polarization
H 656	M 617	H5-27 Do you perform tasks on antennas with circular polarization
H 657	M 616	H5-28 Do you perform tasks on antennas with unidirectional radiation patterns
H 658	M 615	H5-29 Do you perform tasks on antennas with bidirectional radiation patterns
H 659	M 614	H5-30 Do you perform tasks on antennas with omnidirectional radiation patterns

0043	IX.	Radio Frequency (RF) Measurements or Calculations
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0044	IX 1.	IL RF Measurements
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	I 660	I1-1	Do you measure RF power	91	73	85	67	89	73	82	2	6	2	6	79	68	86
I 661	I1-2	Do you measure RF peak power	84	70	77	31	88	46	43	2	4	1	3	59	44	59	
I 662	I1-3	Do you measure RF average power	88	72	81	33	85	39	39	1	2	1	3	50	38	48	
I 663	I1-4	Do you measure RF effective power	49	43	57	24	37	36	36	1	1	0	3	34	30	29	
I 664	I1-5	Do you measure RF output power using wattmeters	62	56	50	47	87	74	74	1	4	1	6	73	68	89	

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Task Title

303 303 303 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0045 IX 2. I2 RF Calculations

I 665 I2-1 Do you calculate RF apparent power 29 20 25 11 25 17 17 1 0 0 3 11 11 10  
I 666 I2-2 Do you calculate RF true power 30 24 26 18 36 20 18 1 0 0 3 20 18 15  
I 667 I2-3 Do you calculate RF power loss or gain in db 79 58 69 44 75 42 59 2 4 1 4 47 38 38

0046 X. Additional Circuits, Devices, Systems, or Items

0047 X 1. J1 Microphones and Speakers

J 668 J1-1 Do you trace block diagrams of circuits containing microphones 15 4 22 23 18 73 8 6 1 1 3 31 36 55  
J 669 J1-2 Do you trace schematic diagrams of microphone circuits 13 4 20 19 18 70 6 6 1 1 2 28 26 48  
J 670 J1-3 Do you troubleshoot to isolate a faulty microphone 14 4 21 22 18 74 9 6 1 1 3 37 39 48  
J 671 J1-4 Do you troubleshoot microphones 10 4 17 17 14 66 6 4 0 0 2 21 18 32  
J 672 J1-5 Do you work on carbon microphones 8 2 13 16 9 69 8 4 1 0 2 24 30 45  
J 673 J1-6 Do you work on capacitor microphones 1 2 2 2 2 16 2 1 0 0 1 2 2 7  
J 674 J1-7 Do you work on crystal microphones 3 2 5 4 5 14 4 1 0 0 0 5 3 5  
J 675 J1-8 Do you work on dynamic microphones 7 3 17 10 11 70 3 3 1 0 2 28 33 48  
J 676 J1-9 Do you work on velocity ribbon microphones 1 2 2 0 1 5 1 0 0 0 0 2 1 2  
J 677 J1-10 Do you trace block diagrams of circuits containing speakers 17 6 23 36 18 76 12 11 10 1 4 42 39 43  
J 678 J1-11 Do you trace schematic diagrams of speaker circuits 17 6 22 33 18 73 10 10 9 1 4 34 30 38  
J 679 J1-12 Do you troubleshoot to isolate a faulty speaker 16 6 22 34 18 75 13 12 10 1 4 44 41 40  
J 680 J1-13 Do you troubleshoot speakers 11 6 16 23 12 57 9 5 3 1 2 15 17 21

0048 X 2. J2 Photosensitive Devices

J 681 J2-1 Do you trace block diagrams of circuits containing photosensitive devices 47 19 24 9 5 23 12 34 4 1 1 8 5 3  
J 682 J2-2 Do you trace schematic diagrams of photosensitive device circuits 44 19 22 9 5 22 12 32 4 1 1 7 5 2  
J 683 J2-3 Do you troubleshoot to isolate a faulty photosensitive device 44 19 21 8 5 21 12 34 5 2 0 7 3 2  
J 684 J2-4 Do you adjust or calibrate photosensitive devices 36 14 13 7 4 16 7 27 3 0 0 4 1 0  
J 685 J2-5 Do you work on photodiodes 15 9 10 3 2 13 4 26 2 1 0 3 1 1  
J 686 J2-6 Do you work on phototransistors 10 6 12 2 1 10 3 17 2 1 1 3 1 0  
J 687 J2-7 Do you work on phototubes 39 14 6 5 0 2 2 1 0 0 1 1 0 0  
J 688 J2-8 Do you work on photo-SCRs 5 3 5 1 0 5 1 4 0 0 1 1 1 1

D  
T Tsk  
Y Nbr  
Task Title  
303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C  
J 689 J2-9 Do you work on photocells (Photoconductive or  
Photovoltaic) 14 9 13 4 5 14 8 18 2 1 0 2 1 1

0049 X 3. J3 Storage Type Display Tubes

J 690 J3-1 Do you trace block diagrams of circuits containing  
display tubes 9 2 6 1 4 1 5 3 0 0 5 14 5 9  
J 691 J3-2 Do you trace schematic diagrams of display  
tubes or circuits 9 2 5 1 4 1 3 3 0 0 4 14 4 7  
J 692 J3-3 Do you troubleshoot to isolate a faulty display tube  
J 693 J3-4 Do you adjust or calibrate display tubes or circuits 9 2 6 1 4 1 3 3 0 0 3 14 4 9  
J 694 J3-5 Do you work on direct view storage tubes (DVST) 8 2 6 1 4 1 3 3 0 1 2 13 4 7  
J 695 J3-6 Do you work on multiple mode storage tubes (MMST) 3 1 6 1 1 0 2 2 0 0 3 12 3 9  
J 696 J3-7 Do you work on scan converter tubes (SCT) 1 1 2 0 1 0 1 1 0 0 2 1 1 1  
1 1 2 0 1 0 1 1 0 0 0 1 3 1

0050 X 4. J4 Television, Laser, and Infrared Systems

J 697 J4-1 Do you trace block diagrams of TV systems or  
subassemblies 51 1 32 17 1 4 2 3 1 1 7 1 0 1  
J 698 J4-2 Do you trace schematic diagrams of TV systems or  
component circuits 52 1 30 17 1 4 2 3 1 1 7 1 0 1  
J 699 J4-3 Do you troubleshoot TV systems to major  
subassemblies 51 1 27 16 1 4 2 3 1 1 6 1 0 1  
J 700 J4-4 Do you troubleshoot TV systems to circuit  
level components 49 1 22 15 1 3 2 2 0 0 3 0 0 1  
J 701 J4-5 Do you adjust or calibrate TV systems or  
components 50 1 26 16 1 4 2 3 0 1 3 0 0 1  
J 702 J4-6 Do you trace block diagrams of laser systems  
or subassemblies 1 1 3 1 0 2 1 3 0 2 1 0 1 0  
J 703 J4-7 Do you trace schematic diagrams of laser systems  
or component circuits 1 1 3 1 0 2 1 2 0 1 1 0 0 0  
J 704 J4-8 Do you troubleshoot laser systems to major  
subassemblies 0 1 3 0 0 2 1 3 0 1 1 0 1 0  
J 705 J4-9 Do you troubleshoot laser systems to circuit  
level components 1 1 1 0 0 1 1 1 0 1 1 0 0 0  
J 706 J4-10 Do you adjust or calibrate laser systems  
or components 1 1 1 1 0 2 1 2 0 1 1 0 0 0  
J 707 J4-11 Do you trace block diagrams of infrared systems  
or subassemblies 0 1 2 0 1 1 1 1 0 1 2 0 0 0  
J 708 J4-12 Do you trace schematic diagrams of infrared  
systems or component circuits 1 1 1 0 1 1 1 1 0 1 1 0 0 0  
J 709 J4-13 Do you troubleshoot infrared systems to major  
subassemblies 0 1 2 0 1 1 1 1 0 0 1 1 0 0  
J 710 J4-14 Do you troubleshoot infrared systems circuit  
level components 1 1 1 0 1 1 1 1 0 0 1 0 0 0

D T Tsk Y Nbr	Task Title																
		303	303	303	304	304	304	304	304	305	455	455	455	455	455	455	455
		51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C		
J 711	J4-15 Do you inspect, clean, or service infrared systems or components	1	1	1	0	1	1	1	0	0	1	1	0	0	0	0	0
J 712	J4-16 Do you adjust or calibrate infrared systems or components	1	1	1	0	1	0	1	0	0	1	1	0	0	0	0	0

0051

Tasks not referenced

Report Option Table for Modules

Option	Status
Primary Sort	Inventory Sequence
Secondary Sort	Not Used
Print Suppress	Not Used

Report Option Table for Tasks

Option	Status
Primary Sort	Inventory Sequence
Secondary Sort	Not Used
Print Suppress	Not Used

Description of Reported Module Factors

Col	Factor	Source vector	Title	Module Statement	Number Members	Mean	S.D.	Max	Min	Valid
1	TITLE									

Description of Reported Task Factors

Col	Factor	Source vector	Title	Task Statement	Number Members	Mean	S.D.	Max	Min	Valid
1	TITLE									
2	F0097	GP0136/PHP		GP0136/PHP	59	31.88	28.14	96.61	.00	712
3	F0098	GP0138/PHP		GP0138/PHP	83	34.98	25.99	100.00	.00	712
4	F0100	GP0140/PHP		GP0140/PHP	113	24.68	18.84	98.23	.00	712
5	F0101	GP0141/PHP		GP0141/PHP	107	20.11	18.86	94.39	.00	712
6	F0025	GP0028/PHP		GP0028/PHP	258	6.84	12.05	88.76	.00	712

Electronic Principles Inventory (EPI) data for Air Force specialties is presented below in job inventory order. Data for this report was collected from job incumbents during the period March 1987 - September 1988

Percent members responding "YES" is shown for each specialty listed. Where skill level is not specified, both 5 and 7 skill levels are included (e.g., DAFSC 000X0 includes 00050 and 00070).

For assistance in using this EPI printout phone USAFOMC/ONVA, at AUTOVON 487-6623.

D	T Tsk	Task Title	455	455	456	456	493
Y Nbr			X4	X6	X1A	X1B	50

#### 0001 EPI Electronic Principles Inventory

#### 0002 I. General Electronic/Electricity

#### 0003 I 1. A1 Direct/Alternating Current

A 1	A1-1 Do you use metric terms (example milli, kilo, mega)	81	76	73	72	78
A 2	A1-2 Do you use basic DC electrical/electronic terms	97	96	95	93	89
A 3	A1-3 Do you use basic AC electrical/electronic terms	97	96	93	93	83
A 4	A1-4 Do you trace schematic or block diagrams of circuits containing conductors, fuses, lamps, switches, or batteries	97	96	89	94	41
A 5	A1-5 Do you troubleshoot circuits containing conductors, fuses, lamps, switches, or batteries	95	96	86	94	57
A 6	A1-6 Do you calculate values of DC voltage, current, resistance, or power	69	48	43	47	40
A 7	A1-7 Do you calculate values of AC effective voltage, average voltage, or peak-to-peak voltage	66	51	42	39	34
A 8	A1-8 Do you calculate values of frequency, phase relationship, or wave length	64	51	46	50	45
A 9	A1-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79	15
A 10	A1-10 Do you troubleshoot circuits to isolate a faulty resistor	53	83	59	55	14
A 11	A1-11 Do you calibrate or adjust circuits by using variable resistors	85	92	73	71	17
A 12	A1-12 Do you calculate the value of a resistor required for a circuit	15	41	23	26	10

D T Tsk Y Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
A 13	Al-13 Do you determine ohmic value of a resistor using the color code	27	70	48	49	12
A 14	Al-14 Do you ohm check resistors	69	82	63	66	13
A 15	Al-15 Do you trace schematic or block diagrams of circuits containing relays	93	94	82	82	14
A 16	Al-16 Do you troubleshoot circuits to isolate a faulty relay	90	92	73	76	16
A 17	Al-17 Do you adjust relays	14	61	17	17	5
A 18	Al-18 Do you perform tasks on contacts, cores, coils, armatures, or springs	14	42	26	21	4
A 19	Al-19 Do you continuity check relays	78	83	62	69	10
A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54	5
A 21	Al-21 Do you troubleshoot circuits to isolate a faulty inductor, choke, or choke coil	29	77	45	37	4
A 22	Al-22 Do you calculate values of circuit total inductance	10	34	14	11	5
A 23	Al-23 Do you calculate values of circuit or component inductive reactance	10	30	12	10	4
A 24	Al-24 Do you calculate values of circuit voltage or current in circuits containing inductors	10	34	19	11	5
A 25	Al-25 Do you calibrate or adjust circuits by using variable inductors	14	63	25	18	4
A 26	Al-26 Do you ohm check inductors	24	69	42	35	5
A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71	8
A 28	Al-28 Do you troubleshoot circuits to isolate a faulty capacitor	53	84	58	49	8
A 29	Al-29 Do you calculate values of circuit total capacitance	14	33	18	14	5
A 30	Al-30 Do you calculate values of circuit or component capacitive reactance	14	33	17	11	5
A 31	Al-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors	19	39	22	17	5
A 32	Al-32 Do you calibrate or adjust circuits using variable capacitors	19	70	34	25	4
A 33	Al-33 Do you ohm check capacitors	41	76	51	40	5
A 34	Al-34 Do you use capacitor color codes in your present job	14	23	9	14	3
A 35	Al-35 Do you trace schematic or block diagrams of circuits containing transformers	86	93	64	61	9
A 36	Al-36 Do you troubleshoot circuits to isolate a faulty transformer	83	89	56	50	9
A 37	Al-37 Do you calculate transformer voltage or current step-up or step-down ratios	27	46	24	21	6
A 38	Al-38 Do you calculate impedance of transformers	17	31	9	11	5
A 39	Al-39 Do you calibrate or adjust circuits using variable transformers	20	51	27	19	6
A 40	Al-40 Do you ohm check transformers	51	75	38	36	7
A 41	Al-41 Do you measure transformer output voltage	66	77	50	48	9
A 42	Al-42 Do you trace schematic or block diagrams of circuits containing three phase transformers	73	82	46	47	3

D	T Task	Task Title	455	456	456	493
Y	Nbr		X4	X6	X1A	X1B 50
A	43	A1-43 Do you troubleshoot circuits to isolate a faulty three phase transformer	68	77	40	41 3
A	44	A1-44 Do you adjust three phase transformers	17	37	20	21 3

0004 I 2. A2 Electro/Mechanical Devices

A	45	A2-1 Do you trace schematic or block diagrams of circuits containing DC motors	37	57	44	29	2
A	46	A2-2 Do you troubleshoot circuits to isolate a faulty DC motor	36	54	42	28	3
A	47	A2-3 Do you troubleshoot DC motor component parts	7	18	18	8	2
A	48	A2-4 Do you perform tasks on DC motor component parts	7	16	12	11	2
A	49	A2-5 Do you trace schematic or block diagrams of circuits containing AC motors	31	52	43	26	2
A	50	A2-6 Do you troubleshoot circuits to isolate a faulty AC motor	29	47	40	23	3
A	51	A2-7 Do you troubleshoot AC motor component parts	8	17	15	7	2
A	52	A2-8 Do you perform tasks on AC motor component parts	7	13	12	7	2
A	53	A2-9 Do you trace schematic or block diagrams of circuits containing DC generators	8	28	17	19	3
A	54	A2-10 Do you troubleshoot to isolate a faulty DC generator	8	29	12	16	6
A	55	A2-11 Do you troubleshoot DC generator component parts	3	17	4	10	3
A	56	A2-12 Do you perform tasks on component parts of DC generators	3	16	4	9	2
A	57	A2-13 Do you trace schematic or block diagrams of circuits containing AC generators	10	24	13	13	3
A	58	A2-14 Do you troubleshoot circuits to isolate a faulty AC generator	8	24	9	9	4
A	59	A2-15 Do you troubleshoot AC generator component parts	5	12	4	7	2
A	60	A2-16 Do you perform tasks on component parts of AC generators	5	10	4	6	3
A	61	A2-17 Do you trace schematic or block diagrams of circuits containing alternators	2	5	1	2	1
A	62	A2-18 Do you troubleshoot circuits to isolate a faulty alternator	2	4	1	2	1
A	63	A2-19 Do you troubleshoot alternator component parts	2	2	1	2	0
A	64	A2-20 Do you perform tasks on component parts of alternators	2	2	1	2	0
A	65	A2-21 Do you trace schematic or block diagrams of circuits containing synchros or servos	20	81	16	11	1
A	66	A2-22 Do you troubleshoot circuits to isolate a faulty synchro or servo	19	78	16	10	2
A	67	A2-23 Do you troubleshoot synchro or servo component parts	8	53	11	7	0
A	68	A2-24 Do you perform tasks on component parts of synchros or servos	8	45	9	7	0
A	69	A2-25 Do you trace schematic or block diagrams of circuits containing choppers	3	8	4	4	0
A	70	A2-26 Do you troubleshoot circuits to isolate a faulty chopper	3	6	3	4	1



D T Tsk Y Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
A 71	A2-27 Do you measure chopper coil excitation frequency	2	2	1	3	1
A 72	A2-28 Do you measure chopper coil voltage-current phase relationship	2	2	1	3	1
A 73	A2-29 Do you trace schematic or block diagrams of circuits containing transducers	20	8	7	9	0
A 74	A2-30 Do you troubleshoot circuits to isolate a faulty transducer	17	8	6	9	0
A 75	A2-31 Do you calibrate or adjust transducers	7	5	2	7	0
A 76	A2-32 Do you repair, clean or lubricate transducers	5	4	4	6	0
A 77	A2-33 Do you trace schematic or block diagrams of circuits containing solenoids	75	47	28	17	2
A 78	A2-34 Do you troubleshoot circuits to isolate a faulty solenoid	73	42	27	16	2
A 79	A2-35 Do you perform maintenance on solenoid component parts	46	14	11	4	1
A 80	A2-36 Do you trace schematic or block diagrams of circuits containing meter movements	15	73	36	29	6
A 81	A2-37 Do you troubleshoot circuits to isolate a faulty meter movement	10	77	35	26	5
A 82	A2-38 Do you perform maintenance on meter movement mechanical parts	3	41	12	12	3

## 0005 I 3. A3 Solid State Circuits and Devices

A 83	A3-1 Do you trace schematic or block diagrams of circuits containing diodes	86	89	70	73	6
A 84	A3-2 Do you troubleshoot circuits to isolate a faulty diode	66	83	60	57	7
A 85	A3-3 Do you check diodes using an ohmmeter	56	82	61	58	6
A 86	A3-4 Do you use diode characteristic curves	27	28	14	10	3
A 87	A3-5 Do you use diode substitution information	15	46	25	13	3
A 88	A3-6 Do you use diode color codes	14	19	7	17	3
A 89	A3-7 Do you trace schematic or block diagrams of circuits containing transistors	92	88	67	68	7
A 90	A3-8 Do you troubleshoot circuits to isolate a faulty transistor	64	82	57	46	7
A 91	A3-9 Do you check transistors using an ohmmeter	46	75	55	43	5
A 92	A3-10 Do you check transistors using transistor testers	19	60	21	17	3
A 93	A3-11 Do you use transistor characteristic curves	10	25	12	5	2
A 94	A3-12 Do you use transistor substitution information	12	48	24	16	2
A 95	A3-13 Do you trace schematic or block diagrams of circuits containing integrated circuits (IC)	92	72	69	65	7
A 96	A3-14 Do you troubleshoot circuits to isolate a faulty IC	71	65	54	42	6
A 97	A3-15 Do you use IC substitution information	39	42	27	16	4
A 98	A3-16 Do you trace schematic or block diagrams of circuits containing solid-state special purpose devices	68	66	48	51	6
A 99	A3-17 Do you troubleshoot circuits to isolate a faulty solid-state special purpose device	61	65	41	41	8
A 100	A3-18 Do you perform tasks on varactors/varicaps	10	52	22	16	2
A 101	A3-19 Do you perform tasks on tunnel diodes	10	33	19	14	2

D	T Task	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
A 102	A3-20	Do you perform tasks on field effect transistors (FET)	19	52	28	24	2
A 103	A3-21	Do you perform tasks on unijunction transistors (UJT)	8	31	24	20	2
A 104	A3-22	Do you perform tasks on zener diodes	49	59	42	36	3
A 105	A3-23	Do you perform tasks on liquid crystal displays (LCD)	20	41	27	25	3
A 106	A3-24	Do you perform tasks on pin diodes	34	25	36	32	1
A 107	A3-25	Do you perform tasks on light emitting diodes (LED)	49	52	50	36	5
A 108	A3-26	Do you perform tasks on fantail transistors	5	14	6	1	0
A 109	A3-27	Do you perform tasks on silicon controlled rectifiers (SCR)	14	41	32	23	1
A 110	A3-28	Do you perform tasks on triacs	3	18	8	4	1
A 111	A3-29	Do you perform tasks on programmable unijunction transistors (PUT)	7	8	3	6	0
A 112	A3-30	Do you perform tasks on silicon controlled switches (SCS)	5	18	7	6	0
A 113	A3-31	Do you perform tasks on silicon unilateral switches (SUS)	5	12	4	3	1
A 114	A3-32	Do you perform tasks on step recovery diodes (SRD)	3	6	6	8	0
A 115	A3-33	Do you perform tasks on field effect diodes (FED)	7	31	17	7	0
A 116	A3-34	Do you perform tasks on DIAC (Bi-directional trigger diode)	2	11	4	4	0
A 117	A3-35	Do you perform tasks on varistors	10	40	16	14	2
A 118	A3-36	Do you perform tasks on metal oxide varistors (MOV)	2	12	4	4	1
A 119	A3-37	Do you perform tasks on schottky diodes	7	33	11	17	1
0006	I 4.	A4 Tubes					
A 120	A4-1	Do you trace block diagrams of circuits containing electron tubes	68	65	35	31	2
A 121	A4-2	Do you trace schematic diagrams of electron tube circuits	66	63	31	26	2
A 122	A4-3	Do you troubleshoot circuits to isolate a faulty electron tube	66	60	33	31	2
A 123	A4-4	Do you use electron tube characteristic curves	47	10	12	7	0
A 124	A4-5	Do you use electron tube substitution manuals or charts	15	18	11	7	0
A 125	A4-6	Do you perform tasks on diode tubes	7	34	19	15	2
A 126	A4-7	Do you perform tasks on triode tubes	15	43	21	12	1
A 127	A4-8	Do you perform tasks on tetrode tubes	5	39	19	9	1
A 128	A4-9	Do you perform tasks on pentode tubes	7	42	22	10	1
A 129	A4-10	Do you perform tasks on beam power tubes	41	7	12	5	0
A 130	A4-11	Do you perform tasks on gas tubes	14	20	13	7	1
A 131	A4-12	Do you perform tasks on phantastrons	3	4	2	2	0
A 132	A4-13	Do you perform tasks on neon tubes	3	8	10	3	0
A 133	A4-14	Do you perform tasks on xenon tubes	3	2	4	0	0
A 134	A4-15	Do you perform tasks on nixie tubes	7	16	12	3	1
A 135	A4-16	Do you trace block diagrams of circuits containing cathode ray tubes (CRT)	36	7	41	44	2
A 136	A4-17	Do you trace schematic diagrams of CRT circuits	31	6	38	37	1

J	T Tsk	Y Mbr	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
A 137			A4-18 Do you troubleshoot to isolate a faulty CRT	36	7	40	42	3
A 138			A4-19 Do you adjust or calibrate circuits that control CRT operations	32	7	38	40	3
A 139			A4-20 Do you perform tasks on electrostatic CRT	14	6	24	20	1
A 140			A4-21 Do you perform tasks on electromagnetic CRT	20	5	27	23	1

0007 I 5. A5 Soldering or Solderless Connections

A 141	A5-1 Do you solder or desolder hardware connections	78	96	89	87	30
A 142	A5-2 Do you solder or desolder component connections such as resistors, capacitors, diodes, transformers, etc connections	49	83	68	68	13
A 143	A5-3 Do you solder or desolder printed circuit board connections	34	81	63	51	10
A 144	A5-4 Do you solder or desolder multi-layer circuit board connections	25	54	31	23	5
A 145	A5-5 Do you perform high reliability soldering	46	80	61	61	14
A 146	A5-6 Do you use crimping tool to repair or make connections	88	95	95	93	33
A 147	A5-7 Do you use wire wrap tool to make connections	95	43	39	36	43
A 148	A5-8 Do you use punch-on tool to make connections	19	25	14	21	29
A 149	A5-9 Do you repair or fabricate connectors or cables on multiconductor cables	63	78	86	87	23
A 150	A5-10 Do you repair or fabricate connectors or cables on coaxial cables	78	96	93	93	26
A 151	A5-11 Do you repair or fabricate connectors or cables on triaxial cables	19	36	35	29	10
A 152	A5-12 Do you repair or fabricate connectors or cables on ribbon cables	19	27	27	23	14

0008 II. Test Equipment

0009 II 1. B1 Multimeters

B 153	B1-1 Do you use the multimeter to measure DC voltage values	95	100	98	93	74
B 154	B1-2 Do you use the multimeter to measure AC voltage values	97	98	93	87	54
B 155	B1-3 Do you use the multimeter to extend the range of voltmeters using external shunts	22	36	24	20	13
B 156	B1-4 Do you use the multimeter to measure DC current values	73	72	54	63	53
B 157	B1-5 Do you use the multimeter to measure AC current values	71	65	55	60	38
B 158	B1-6 Do you use the multimeter to extend the range of ammeters using external shunts	14	30	13	14	11
B 159	B1-7 Do you use the multimeter to measure circuit resistance	85	86	69	75	48
B 160	B1-8 Do you use the multimeter to measure component resistance	86	90	65	69	24

D  
 T Task  
 Y Mbr

455 455 456 456 493  
 X4 X6 X1A X1B 50

Task Title

0010 II 2. B2 Oscilloscopes

B 161 B2-1 Do you use the oscilloscope to measure time to  
 determine frequency 85 65 77 71 38  
 B 162 B2-2 Do you use the oscilloscope to measure time (rise,  
 fall, pulse width, etc) 97 72 79 74 38  
 B 163 B2-3 Do you use the oscilloscope to measure AC voltage 75 71 78 71 33  
 B 164 B2-4 Do you use the oscilloscope to measure DC voltage 88 71 82 68 55  
 B 165 B2-5 Do you use the oscilloscope to measure ripple voltages 39 58 58 58 19  
 B 166 B2-6 Do you use the oscilloscope to measure phase jitters 41 31 19 16 35  
 B 167 B2-7 Do you use the oscilloscope to observe signal/data  
 patterns 85 71 70 57 62  
 B 168 B2-8 Do you use the oscilloscope to observe lissajous  
 patterns 8 60 10 8 13  
 B 169 B2-9 Do you use the oscilloscope to observe phase  
 relationships 75 63 53 47 52  
 B 170 B2-10 Do you use attenuator probes with oscilloscopes 66 63 60 57 22  
 B 171 B2-11 Do you use delay time multipliers with  
 oscilloscopes 39 30 22 21 9

0011 II 3. B3 Signal (Function) Generators

B 172 B3-1 Do you use signal generators (SG) to perform  
 operational checks 68 87 70 64 60  
 B 173 B3-2 Do you use SG to perform alignments, adjustments,  
 or calibrations 76 87 67 58 46  
 B 174 B3-3 Do you use SG to troubleshoot circuits 59 71 63 52 68  
 B 175 B3-4 Do you use audio sine-wave signal generators 8 83 29 14 48  
 B 176 B3-5 Do you use audio non-sinusoidal signal generators 2 34 12 7 15  
 B 177 B3-6 Do you use RF less than 1,000MH signal generators 37 72 46 33 18  
 B 178 B3-7 Do you use RF greater than 1,000MH signal generators 51 31 59 59 10  
 B 179 B3-8 Do you use white noise signal generators 7 25 6 14 15  
 B 180 B3-9 Do you use pattern signal generators 3 20 11 7 53  
 B 181 B3-10 Do you use pseudo-random signal generators 0 18 5 6 26  
 B 182 B3-11 Do you use time mark signal generators 7 22 11 8 12  
 B 183 B3-12 Do you use multi-function (square/sine/triangular)  
 signal generators 25 52 44 26 14  
 B 184 B3-13 Do you use TV signal generators 2 4 3 2 7

0012 II 4. B4 Test Equipment Types

B 185 B4-1 Do you use frequency counters 97 99 75 73 74  
 B 186 B4-2 Do you use spectrum analyzers 93 95 71 71 41

D T Y	Task Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
B 187	B4-3	Do you use field strength testers	8	7	5	7	7
B 188	B4-4	Do you use digital multimeters	97	96	93	79	71
B 189	B4-5	Do you use digital logic probes	24	43	36	18	9
B 190	B4-6	Do you use capacitance testers	8	25	12	9	9
B 191	B4-7	Do you use capacitor substitution boxes	5	13	4	4	7
B 192	B4-8	Do you use DC restorers (CRT rejuvenators)	2	5	2	2	7
B 193	B4-9	Do you use logic current tracers	12	20	7	7	5
B 194	B4-10	Do you use tube testers	3	19	16	9	6
B 195	B4-11	Do you use logic pulsers	5	22	10	5	6
B 196	B4-12	Do you use logic analyzers	12	41	19	8	8
B 197	B4-13	Do you use signature analyzers	7	7	8	5	7
B 198	B4-14	Do you use reflectometers	63	19	34	30	7
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0013	III.	Amplifier Circuits					
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0014	III 1.	C1 Transistor Amplifier Circuits					
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C 199	C1-1	Do you trace block diagrams of circuits containing transistor amplifiers	71	80	50	46	12
C 200	C1-2	Do you trace schematic diagrams of transistor amplifier circuits	51	73	46	38	6
C 201	C1-3	Do you troubleshoot to isolate a faulty transistor amplifier	47	75	41	31	14
C 202	C1-4	Do you troubleshoot transistor amplifiers to circuit level components	22	63	35	23	9
C 203	C1-5	Do you troubleshoot transistor amplifier distortion	10	43	23	13	8
C 204	C1-6	Do you adjust or align transistor amplifiers	15	53	27	21	19
C 205	C1-7	Do you measure transistor amplifier voltage, current, or power gain	36	57	35	27	14
C 206	C1-8	Do you calculate values of transistor amplifier voltage, current or power gain	20	23	19	9	8
C 207	C1-9	Do you work on compound-connected (Darlington Pair) transistor amplifiers	3	29	23	11	2
C 208	C1-10	Do you work on cascade-connected transistor amplifiers	10	29	25	16	2
C 209	C1-11	Do you work on paraphase transistor amplifiers	5	18	18	11	2
C 210	C1-12	Do you work on push-pull transistor amplifiers	22	60	35	23	4
C 211	C1-13	Do you work on audio transistor amplifiers	3	76	30	10	21
C 212	C1-14	Do you work on wideband transistor amplifiers	20	48	29	22	7
C 213	C1-15	Do you work on IF transistor amplifiers	54	71	36	28	3
C 214	C1-16	Do you work on RF transistor amplifiers	68	71	47	38	5
C 215	C1-17	Do you work on buffer transistor amplifiers	24	54	19	15	3
C 216	C1-18	Do you work on complementary symmetry transistor amplifiers	5	23	13	12	2
C 217	C1-19	Do you work on DC transistor amplifiers (switching applications)	29	49	26	22	4

D	T Task	Y Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50

0015 III 2. C2 Transistor Amplifier Stabilization Circuits

C 218	C2-1 Do you trace schematic diagrams of amplifier stabilization circuits	29	47	30	15	2
C 219	C2-2 Do you troubleshoot amplifier stabilization circuits to circuit level components	20	43	25	8	2
C 220	C2-3 Do you perform tasks on emitter (swamping) resistor stabilization amplifiers	17	54	27	17	2
C 221	C2-4 Do you perform tasks on self-bias stabilization amplifiers	14	43	24	11	2
C 222	C2-5 Do you perform tasks on thermistor stabilization amplifiers	31	46	24	12	2
C 223	C2-6 Do you perform tasks on diode stabilization amplifiers	22	47	28	17	1
C 224	C2-7 Do you perform tasks on double diode stabilization amplifiers	10	23	10	7	1

0016 III 3. C3 Coupling Circuits

C 225	C3-1 Do you trace block diagrams of circuits containing coupling circuits	47	60	41	36	3
C 226	C3-2 Do you trace schematic diagrams of coupling circuits	39	57	38	31	2
C 227	C3-3 Do you troubleshoot circuits to isolate a faulty coupling circuit	34	58	32	24	3
C 228	C3-4 Do you troubleshoot coupling circuits to circuit level components	17	47	27	18	2
C 229	C3-5 Do you perform tasks on direct coupling circuits	36	55	36	31	3
C 230	C3-6 Do you perform tasks on capacitive-resistive coupling circuits	19	41	28	21	2
C 231	C3-7 Do you perform tasks on capacitive-inductive coupling circuits	24	49	28	17	2
C 232	C3-8 Do you perform tasks on transformer coupling circuits	25	57	30	21	3
C 233	C3-9 Do you perform tasks on optical coupling circuits	15	11	5	4	1

0017 III 4. C4 Electron Tube Amplifier Circuits

C 234	C4-1 Do you trace block diagrams of circuits containing electron tube amplifiers	80	51	28	23	2
C 235	C4-2 Do you trace schematic diagrams of electron tube amplifiers	71	48	24	16	1
C 236	C4-3 Do you troubleshoot to isolate a faulty electron tube amplifier	78	46	24	21	1

T Y	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
C 237	C4-4 Do you troubleshoot electron tube amplifiers to circuit level components	34	42	16	10	1
C 238	C4-5 Do you troubleshoot electron tube amplifier distortion	46	30	14	10	0
C 239	C4-6 Do you adjust or align electron tube amplifiers	63	41	20	13	2
C 240	C4-7 Do you measure electron tube amplifier voltage, current, or power gain	76	40	19	22	2
C 241	C4-8 Do you calculate values of electron tube amplifier voltage, current, or power gain	69	17	11	8	1
C 242	C4-9 Do you perform tasks on paraphase electron tube amplifiers	3	18	14	5	0
C 243	C4-10 Do you perform tasks on push-pull electron tube amplifiers	5	27	17	5	2
C 244	C4-11 Do you perform tasks on audio electron tube amplifiers	5	31	12	2	2
C 245	C4-12 Do you perform tasks on voltage regulator electron tube amplifiers	31	29	18	7	1
C 246	C4-13 Do you perform tasks on common grid electron tube amplifiers	31	35	18	7	0
C 247	C4-14 Do you perform tasks on common cathode electron tube amplifiers	54	34	17	8	0
C 248	C4-15 Do you perform tasks on cathode follower electron tube amplifiers	15	28	15	7	0

## 0018 III 5. C5 Operational Amplifiers

C 249	C5-1 Do you trace block or schematic diagrams of circuits containing operational amplifiers (op amps)	59	46	36	28	6
C 250	C5-2 Do you troubleshoot to isolate a faulty op amp circuit	46	41	29	20	11
C 251	C5-3 Do you calculate op amp gain	19	22	12	9	10
C 252	C5-4 Do you adjust op amp bias, offsets, or drift	25	27	18	14	10
C 253	C5-5 Do you use or apply operational amplifiers for general purpose (inverting or non-inverting)	39	45	26	19	
C 254	C5-6 Do you use or apply operational amplifiers as differential/comparators	20	29	20	15	1
C 255	C5-7 Do you use or apply operational amplifiers for summing	19	28	17	9	1
C 256	C5-8 Do you use or apply operational amplifiers for unity gain amplifier (buffer)	22	29	19	10	5
C 257	C5-9 Do you use or apply operational amplifiers as active filters	17	23	7	8	2
C 258	C5-10 Do you use or apply operational amplifiers as oscillators	32	34	23	20	3
C 259	C5-11 Do you use or apply operational amplifiers as integrators	15	18	11	7	1
C 260	C5-12 Do you use or apply operational amplifiers for differentiators	12	20	12	8	2
C 261	C5-13 Do you use or apply operational amplifiers for power supplies (voltage regulators)	53	45	27	25	5

D T Y	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
C 262	C5-14 Do you use or apply operational amplifiers as analog/digital (A/D) digital/analog (D/A) converters	68	35	29	20	16
C 263	C5-15 Do you use or apply operational amplifiers as multivibrators	36	36	26	14	3
C 264	C5-16 Do you use or apply operational amplifiers as modulators/demodulators	29	47	25	19	9

0019 III 6. C6 Magnetic Amplifiers

C 265	C6-1 Do you trace block diagrams of circuits containing magnetic amplifiers	5	2	6	7	0
C 266	C6-2 Do you trace schematic diagrams of magnetic amplifier circuits	5	1	5	6	1
C 267	C6-3 Do you troubleshoot to isolate a faulty magnetic amplifier	7	1	5	5	0
C 268	C6-4 Do you troubleshoot magnetic amplifiers to circuit level components	0	1	4	4	0
C 269	C6-5 Do you adjust magnetic amplifiers or components	3	1	5	5	0
C 270	C6-6 Do you trace block diagrams of circuits containing saturable reactors	3	5	11	6	0
C 271	C6-7 Do you trace schematic diagrams of saturable reactor circuits	3	6	10	4	0
C 272	C6-8 Do you troubleshoot to isolate a faulty saturable reactor	3	6	8	4	0
C 273	C6-9 Do you troubleshoot saturable reactors to circuit level components	3	5	6	2	0
C 274	C6-10 Do you adjust saturable reactor circuits or components	2	6	5	3	0

0020 IV. Power Supplies

0021 IV 1. D1 Power Supply Circuits

D 275	D1-1 Do you trace block diagrams of circuits containing power supplies	92	90	75	71	12
D 276	D1-2 Do you trace schematic diagrams of power supply circuits	88	81	60	56	8
D 277	D1-3 Do you troubleshoot circuits to isolate a faulty power supply	92	82	71	62	23
D 278	D1-4 Do you troubleshoot power supplies to circuit level components	39	65	39	24	6
D 279	D1-5 Do you align or adjust power supplies	56	82	66	59	9
D 280	D1-6 Do you perform tasks on half-wave rectifier power supplies	31	63	36	29	3



D T Y	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
D 281	D1-7 Do you perform tasks on full-wave rectifier power supplies	34	66	36	29	3
D 282	D1-8 Do you perform tasks on full-wave bridge rectifier power supplies	27	72	40	31	4
D 283	D1-9 Do you perform tasks on three-phase rectifier power supplies	42	47	34	28	1
D 284	D1-10 Do you perform tasks on voltage multipliers (doublers/triplers)	29	49	27	18	3
D 285	D1-11 Do you perform tasks on DC to DC converters	36	52	32	19	5
D 286	D1-12 Do you perform tasks on inverters (DC to AC converters)	63	46	29	18	5
D 287	D1-13 Do you perform tasks on switching power supplies	19	20	7	8	7

## 0022 IV 2. D2 Power Supply Filters

D 288	D2-1 Do you trace block diagrams of circuits containing power supply filters	59	52	40	31	2
D 289	D2-2 Do you trace schematic diagrams of power supply filters	42	46	33	23	2
D 290	D2-3 Do you troubleshoot circuits to isolate a faulty power supply filter	46	48	35	23	3
D 291	D2-4 Do you troubleshoot power supply filters to circuit level components	14	37	27	14	2
D 292	D2-5 Do you perform tasks on capacitive power supply filters	19	39	32	21	2
D 293	D2-6 Do you perform tasks on inductive power supply filters	17	37	27	18	1
D 294	D2-7 Do you perform tasks on L-type power supply filters	8	33	25	13	2
D 295	D2-8 Do you perform tasks on Pi-type power supply filters	8	33	20	12	2
D 296	D2-9 Do you perform tasks on T-type power supply filters	7	35	13	11	2
D 297	D2-10 Do you perform tasks on resistive capacitive (RC) power supply filters	19	39	31	18	2
D 298	D2-11 Do you perform tasks on inductive capacitive (LC) power supply filters	20	40	29	17	2

## 0023 IV 3. D3 Power Supply Voltage Regulators

D 299	D3-1 Do you trace block diagrams of circuits containing power supply voltage regulators	85	66	44	40	3
D 300	D3-2 Do you trace schematic diagrams of power supply voltage regulator circuits	69	61	41	31	2
D 301	D3-3 Do you troubleshoot circuits to isolate a faulty power supply voltage regulator	81	58	39	32	4
D 302	D3-4 Do you troubleshoot power supply voltage regulators to circuit level components	20	53	31	21	2
D 303	D3-5 Do you perform tasks on variable resistor power supply voltage regulators	39	57	35	27	2

D	T Task	Task Title	455	455	456	456	493
Y Mbr			X4	X6	X1A	X1B	50
D 304		D3-6 Do you perform tasks on zener diode power supply voltage regulators	37	47	33	19	2
D 305		D3-7 Do you perform tasks on transistor series power supply voltage regulators	29	43	27	17	2
D 306		D3-8 Do you perform tasks on IC power supply voltage regulators	20	33	20	9	2
D 307		D3-9 Do you perform tasks on pulse width modulator power supply voltage regulators	17	23	15	9	1
D 308		D3-10 Do you perform tasks on transistor series power supply voltage regulators with current limiting	29	40	20	11	2
D 309		D3-11 Do you perform tasks on crow bar power supply voltage regulators	59	40	7	3	1

#### 0024 V. Reactive Circuits

#### 0025 V 1. E1 Resistive Capacitive Inductive Circuits

E 310	E1-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	39	47	29	25	3
E 311	E1-2 Do you troubleshoot RCL circuits to circuit level components	19	47	26	15	2
E 312	E1-3 Do you trace schematic or block diagrams of circuits containing resonant RCL circuits	25	43	24	18	3
E 313	E1-4 Do you troubleshoot resonant RCL circuits to circuit level components	8	40	19	9	2
E 314	E1-5 Do you calculate values of impedance, voltage, or current in RCL circuits	8	12	14	7	2
E 315	E1-6 Do you calculate phase angle of RCL circuits	5	13	5	6	0
E 316	E1-7 Do you calculate values of power in RCL circuits	5	14	7	7	2

#### 0026 V 2. E2 Frequency Sensitive Filters

E 317	E2-1 Do you trace schematic or block diagrams of circuits containing frequency sensitive filters	56	59	39	41	6
E 318	E2-2 Do you troubleshoot circuits to isolate a faulty frequency sensitive filter	47	57	36	34	10
E 319	E2-3 Do you troubleshoot frequency sensitive filters to circuit level components	20	36	22	15	4
E 320	E2-4 Do you align or adjust frequency sensitive filters	19	35	25	18	5
E 321	E2-5 Do you calculate capacitance or inductance values for specific frequency sensitive filters	5	19	7	5	1
E 322	E2-6 Do you perform tasks on low pass frequency sensitive filters	42	58	32	36	7

D	T Task	Y Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
E	323		E2-7 Do you perform tasks on high pass frequency sensitive filters	42	52	28	28	7
E	324		E2-8 Do you perform tasks on band pass frequency sensitive filters	66	65	42	44	10
E	325		E2-9 Do you perform tasks on band-reject frequency sensitive filters	29	40	25	18	8
E	326		E2-10 Do you perform tasks on ferrite bead frequency sensitive filters	8	18	4	3	2

## 0027 VI. Waveshaping/Generating Circuits

## 0028 VI 1. Fl Oscillators

F	327	Fl-1	Do you trace block diagrams of circuits containing oscillators	80	66	52	52	7
F	328	Fl-2	Do you trace schematic diagrams of oscillator circuits	69	65	42	37	4
F	329	Fl-3	Do you troubleshoot to isolate a faulty oscillator circuit	78	60	42	45	7
F	330	Fl-4	Do you troubleshoot oscillators to circuit level components	27	55	26	20	3
F	331	Fl-5	Do you align or adjust oscillator circuits	58	58	35	38	5
F	332	Fl-6	Do the oscillators you work with use LC tank circuits	20	49	32	17	2
F	333	Fl-7	Do the oscillators you work with use RC networks	24	52	29	17	3
F	334	Fl-8	Do the oscillators you work with use crystals	58	61	34	26	6
F	335	Fl-9	Do the oscillators you work with use phase lock loops (PLL)	78	53	17	10	3
F	336	Fl-10	Do you perform tasks on series Hartley oscillator circuits	15	40	19	14	2
F	337	Fl-11	Do you perform tasks on shunt Hartley oscillator circuits	17	31	18	12	1
F	338	Fl-12	Do you perform tasks on Colpitts oscillator circuits	8	25	17	11	1
F	339	Fl-13	Do you perform tasks on Clapp oscillator circuits	3	17	4	4	1
F	340	Fl-14	Do you perform tasks on voltage control oscillators (VCO/VTD)	56	40	34	38	2
F	341	Fl-15	Do you perform tasks on crystal oscillator circuits	44	51	28	21	4
F	342	Fl-16	Do you perform tasks on Wien bridge oscillator circuits	3	19	11	7	1
F	343	Fl-17	Do you perform tasks on pulse generating oscillator circuits	34	24	13	8	2
F	344	Fl-18	Do you perform tasks on blocked/blocking oscillator circuits	5	16	10	7	0
F	345	Fl-19	Do you perform tasks on burst generators	3	12	5	3	1
F	346	Fl-20	Do you perform tasks on RC phase shift oscillators	10	30	17	9	1

D  
T Task  
Y Nbr Task Title

0029 VI 2. F2 Multivibrators

F 347	F2-1 Do you trace block diagrams of circuits containing multivibrators	56	45	31	26	1
F 348	F2-2 Do you trace schematic diagrams of multivibrator circuits	41	42	27	19	1
F 349	F2-3 Do you troubleshoot to isolate a faulty multivibrator circuit	32	41	25	21	1
F 350	F2-4 Do you troubleshoot multivibrators to circuit level components	12	39	22	13	1
F 351	F2-5 Do you adjust or align multivibrator circuits	8	31	18	11	1
F 352	F2-6 Do the multivibrators you work with use LC tank circuits	10	39	20	14	1
F 353	F2-7 Do the multivibrators you work with use RC networks	17	39	21	16	1
F 354	F2-8 Do the multivibrators you work with use Crystals	24	39	20	17	1
F 355	F2-9 Do you perform tasks on astable (free running) multivibrators	27	37	26	16	2
F 356	F2-10 Do you perform tasks on monostable (one shot) multivibrators	44	35	25	18	1
F 357	F2-11 Do you perform tasks on bistable (flip flop) multivibrators	37	37	27	19	1
F 358	F2-12 Do you perform tasks on triggered astable multivibrators	20	24	21	12	1

0030 VI 3. F3 Waveshaping Circuits

F 359	F3-1 Do you trace block diagrams of circuits containing waveshaping circuits (WSC)	36	36	34	38	1
F 360	F3-2 Do you trace schematic diagrams of WSC	25	34	29	31	0
F 361	F3-3 Do you troubleshoot to isolate a faulty WSC	25	33	26	36	2
F 362	F3-4 Do you troubleshoot WSC to circuit level components	8	25	18	17	0
F 363	F3-5 Do you adjust or calibrate WSC	7	27	22	27	1
F 364	F3-6 Do you perform tasks on sawtooth wave generator WSC	22	29	29	34	1
F 365	F3-7 Do you perform tasks on trapezoidal (ramp) wave generator WSC	8	22	22	21	1
F 366	F3-8 Do you perform tasks on RC differentiating WSC	10	19	12	11	0
F 367	F3-9 Do you perform tasks on RL differentiating WSC	8	19	10	8	0
F 368	F3-10 Do you perform tasks on RC integrating WSC	14	18	10	9	0
F 369	F3-11 Do you perform tasks on RL integrating WSC	8	20	9	8	0
F 370	F3-12 Do you perform tasks on square wave generator WSC	31	30	32	28	5
F 371	F3-13 Do you perform tasks on rectangular wave generator WSC	12	23	24	21	2
F 372	F3-14 Do you perform tasks on Schmitt trigger WSC	17	31	16	16	0

D	T Tsk	Y Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
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0031 VI 4. F4 Limiter/Clamper Circuits

F 373	F4-1 Do you trace block diagrams of circuits containing limiters	36	37	25	17	2
F 374	F4-2 Do you trace schematic diagrams of limiter circuits	24	37	21	15	2
F 375	F4-3 Do you trace block diagrams of circuits containing clampers	20	27	19	13	1
F 376	F4-4 Do you trace schematic diagrams of clamper circuits	15	24	18	13	1
F 377	F4-5 Do you troubleshoot to isolate a faulty limiter circuit	24	34	21	9	2
F 378	F4-6 Do you troubleshoot limiters to circuit level components	10	31	15	8	1
F 379	F4-7 Do you troubleshoot to isolate a faulty clamper circuit	17	27	14	9	2
F 380	F4-8 Do you troubleshoot clampers to circuit level components	8	25	14	7	1
F 381	F4-9 Do you perform tasks on series diode limiter circuits	19	34	14	11	1
F 382	F4-10 Do you perform tasks on shunt diode limiter circuits	17	33	19	11	1
F 383	F4-11 Do you perform tasks on bias limiter circuits	5	24	12	8	1
F 384	F4-12 Do you perform tasks on zener diode circuits	29	36	19	12	2
F 385	F4-13 Do you perform tasks on transistor limiter circuits	15	31	15	10	1
F 386	F4-14 Do you perform tasks on triode limiter circuits	5	18	6	4	0
F 387	F4-15 Do you perform tasks on diode clamper circuits	10	23	14	8	1
F 388	F4-16 Do you perform tasks on bias clamper circuits	5	19	11	7	1

0032 VII. Computers, Digital Circuits, and Devices

0033 VII 1. G1 Digital Logic Numbering Systems and Functions

G 389	G1-1 Do you convert decimal numbers to binary numbers or binary numbers to decimal	85	37	44	36	15
G 390	G1-2 Do you convert octal numbers to binary or binary numbers to octal	95	36	40	25	8
G 391	G1-3 Do you convert hexadecimal numbers to binary or binary numbers to hexadecimal	61	31	29	22	9
G 392	G1-4 Do you convert octal numbers to decimal or decimal numbers to octal	88	34	39	25	9
G 393	G1-5 Do you convert hexadecimal numbers to decimal or decimal numbers to hexadecimal	59	31	27	21	8
G 394	G1-6 Do you convert octal numbers to hexadecimal or hexadecimal numbers to octal	56	30	25	20	6
G 395	G1-7 Do you convert base number fractions to another base numbering system	34	27	15	12	7
G 396	G1-8 Do you add binary numbers	80	28	33	22	10

PH0026

Keesler TTC AFSCs (Inventory Order - 2 of 2)

PRTMOD

D	T	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
G 397		G1-9 Do you subtract binary numbers	75	28	28	18	9
G 398		G1-10 Do you multiply binary numbers	36	22	16	13	6
G 399		G1-11 Do you divide binary numbers	36	20	15	13	6
G 400		G1-12 Do you add octal numbers	83	24	23	15	6
G 401		G1-13 Do you subtract octal numbers	81	22	20	16	5
G 402		G1-14 Do you add hexadecimal numbers	44	24	16	17	4
G 403		G1-15 Do you subtract hexadecimal numbers	44	27	15	15	4
G 404		G1-16 Do you use binary coded decimal (BCD)	59	35	33	25	10
G 405		G1-17 Do you use gray codes	24	10	12	10	6
G 406		G1-18 Do you use ICAO codes	2	5	4	2	2
G 407		G1-19 Do you use excess-3 (XS3) codes	2	12	7	6	3
G 408		G1-20 Do you use parity bit codes	37	25	17	15	19
G 409		G1-21 Do you use binary codes	3	7	4	1	4
G 410		G1-22 Do you use ASCII codes	39	34	25	14	34
G 411		G1-23 Do you use EBCDI codes	2	10	3	2	7
G 412		G1-24 Do you trace data flow through logic symbol diagrams	86	46	52	44	9
G 413		G1-25 Do you trace data flow through logic schematic diagrams	85	45	51	38	7
G 414		G1-26 Do you troubleshoot digital systems to major units	90	53	51	36	33
G 415		G1-27 Do you troubleshoot digital systems subassemblies or circuit cards	85	45	52	36	15
G 416		G1-28 Do you troubleshoot digital systems, subsystems or circuit cards to circuit level components or IC	56	43	40	16	9
G 417		G1-29 Do you trace data flow through circuits using positive logic (High = Binary 1)	83	35	47	38	8
G 418		G1-30 Do you trace data flow through circuits using negative logic (High = Binary 0)	76	33	38	30	7
G 419		G1-31 Do you perform tasks related to AND gates	90	45	49	41	5
G 420		G1-32 Do you perform tasks related to OR gates	90	43	49	42	5
G 421		G1-33 Do you perform tasks related to inhibited gates logic functions	42	35	35	32	3
G 422		G1-34 Do you perform tasks related to NAND or NOR gates	92	43	45	39	4
G 423		G1-35 Do you perform tasks related to exclusive OR/NOR logic functions	90	36	38	33	4
G 424		G1-36 Do you perform tasks related to RS flip flops	56	30	24	17	3
G 425		G1-37 Do you perform tasks related to D(Data) flip flops	56	34	27	18	3
G 426		G1-38 Do you perform tasks related to T(Toggle) flip flops	56	31	19	13	3
G 427		G1-39 Do you perform tasks related to JK flip flops	83	36	28	13	2
G 428		G1-40 Do you perform tasks related to Schmidt triggers	29	33	18	16	3
G 429		G1-41 Do you perform tasks related to delay (One-shot) logic functions	58	29	23	13	3
G 430		G1-42 Do you perform tasks related to open collector gates (wired "AND" or wired "OR")	34	23	19	13	3
G 431		G1-43 Do you perform tasks related to buffers	63	31	27	19	8
G 432		G1-44 Do you perform tasks related to inverters	81	41	40	27	5
G 433		G1-45 Do you perform tasks related to complemented flip flops	42	31	18	12	3
G 434		G1-46 Do you perform tasks related to complementing flip flops	44	28	19	12	3

D	T	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
	Y	Nbr					
G	435	G1-47 Do you develop Boolean equations from logic circuits or diagrams	27	18	12	12	2
G	436	G1-48 Do you develop logic diagrams from Boolean equations	19	19	12	10	2
G	437	G1-49 Do you simplify Boolean expressions using Boolean algebra	15	18	11	9	2
G	438	G1-50 Do you perform tasks on RTL (resistor transistor logic formally DCTL)	19	20	10	6	2
G	439	G1-51 Do you perform tasks on DTL (diode transistor logic)	22	18	12	5	2
G	440	G1-52 Do you perform tasks on TTL (transistor transistor logic)	75	25	27	18	3
G	441	G1-53 Do you perform tasks on ECL/CML (emitter coupled or current mode logic)	47	12	8	4	2
G	442	G1-54 Do you perform tasks on HTL (high threshold logic)	8	13	7	3	2
G	443	G1-55 Do you perform tasks on CMOS (complementary metal oxide semiconductor)	25	24	15	6	2
G	444	G1-56 Do you perform tasks on positive MOS ICs	7	14	7	4	2
G	445	G1-57 Do you perform tasks on negative MOS ICs	10	13	7	4	2
G	446	G1-58 Do you perform tasks on vertical MOS ICs	8	13	4	2	2

0034 VII 2. G2 Computers

G	447	G2-1 Do you trace block or schematic diagrams of computer controlled or computer based systems	69	37	44	47	9
G	448	G2-2 Do you load programs	78	29	49	62	26
G	449	G2-3 Do you write or debug programs	42	4	7	10	9
G	450	G2-4 Do you troubleshoot computers to a major unit	61	30	38	41	17
G	451	G2-5 Do you troubleshoot computers to a subassembly or circuit card	61	22	37	30	6
G	452	G2-6 Do you troubleshoot computer subassembly or circuit card to circuit level components or IC	22	12	19	11	3
G	453	G2-7 Do you use computer flow charts or diagrams	63	20	30	32	8
G	454	G2-8 Do you perform tasks on analog computers	51	18	24	24	14
G	455	G2-9 Do you perform tasks on digital computers	78	31	49	49	27
G	456	G2-10 Do you use Basic computer language	20	7	20	19	20
G	457	G2-11 Do you use COBOL computer language	2	0	3	4	2
G	458	G2-12 Do you use FORTRAN computer language	2	0	14	7	1
G	459	G2-13 Do you use ADA computer language	3	1	2	4	1
G	460	G2-14 Do you use ATLAS computer language	0	0	3	4	1
G	461	G2-15 Do you use ELAN computer language	0	1	2	2	1
G	462	G2-16 Do you use PASCAL computer language	0	0	3	6	2
G	463	G2-17 Do you use RPG computer language	2	0	2	3	1
G	464	G2-18 Do you use Machine computer language	39	2	13	10	5
G	465	G2-19 Do you use C computer language	2	1	4	2	2
G	466	G2-20 Do you perform tasks on magnetic (tape, disc, core) computer memories	73	31	43	57	21
G	467	G2-21 Do you perform tasks on semiconductor (RAM, ROM, EPROM, PROM) computer memories	73	19	45	43	8

D T Task Y Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
G 468	G2-22 Do you perform tasks on paper (tape, punch card) computer memories	63	8	36	37	5
G 469	G2-23 Do you perform tasks on advanced technology (bubble, CCD, electron beam, laser, thin film) computer memories	7	5	9	20	2
G 470	G2-24 Do you perform tasks on computer keyboards	73	31	44	53	43
G 471	G2-25 Do you perform tasks on computer character printers	36	31	27	22	24
G 472	G2-26 Do you perform tasks on magnetic tape drives	49	24	34	34	9
G 473	G2-27 Do you perform tasks on microprocessor computer terminals	19	10	23	18	19
G 474	G2-28 Do you perform tasks on video display unit (VDU/monitors)	31	8	33	33	22
G 475	G2-29 Do you perform tasks on paper tape readers/punches	58	5	35	39	7
G 476	G2-30 Do you perform tasks on paper card readers/punches	12	2	6	9	4
G 477	G2-31 Do you perform tasks on toggle or push button switch inputs	46	8	31	35	6
G 478	G2-32 Do you perform tasks on incandescent displays (Nixie tubes, LEDs, LCDs)	39	20	25	29	5
G 479	G2-33 Do you perform tasks on modems	3	29	14	7	46
G 480	G2-34 Do you perform tasks on line printers	47	20	25	17	28
G 481	G2-35 Do you perform tasks on floppy disc drives	3	1	19	33	29
G 482	G2-36 Do you perform tasks on removable cartridge disc drives	2	4	22	21	11
G 483	G2-37 Do you perform tasks on removable pack disc drives	2	1	15	11	4
G 484	G2-38 Do you perform tasks on fixed Winchester type disc drives	2	2	11	10	12
G 485	G2-39 Do you trace block or schematic diagrams of microprocessor controlled systems	39	22	32	25	3
G 486	G2-40 Do you troubleshoot microprocessor controlled systems to a subassembly or circuit card	37	16	27	20	3
G 487	G2-41 Do you troubleshoot microprocessor controlled systems to isolate a faulty microprocessor	25	19	18	11	4
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0035	VII 3. G3 Digital Circuits					
G 488	G3-1 Do you trace data flow through circuits containing counters	71	29	35	18	3
G 489	G3-2 Do you troubleshoot counter circuits to isolate a faulty counter	59	31	30	15	2
G 490	G3-3 Do you troubleshoot counters to circuit level components	36	28	23	7	2
G 491	G3-4 Do you perform tasks on UP counters in logic circuits	69	33	35	15	1
G 492	G3-5 Do you perform tasks on DOWN counters in logic circuits	66	28	28	13	0
G 493	G3-6 Do you perform tasks on DECADE counters in logic circuits	15	18	21	11	2
G 494	G3-7 Do you perform tasks on ring counters in logic circuits	17	8	20	10	0



D	T	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
G 495		G3-8 Do you perform tasks on modulus counters in logic circuits	22	14	9	3	0
G 496		G3-9 Do you perform tasks on synchronous (parallel) counters in logic circuits	44	25	25	9	2
G 497		G3-10 Do you perform tasks on asynchronous (serial) counters in logic circuits	46	27	27	9	3
G 498		G3-11 Do you trace logic diagrams of circuits containing registers	75	30	32	14	1
G 499		G3-12 Do you troubleshoot circuits containing registers to isolate a faulty register	64	33	25	11	1
G 500		G3-13 Do you troubleshoot registers to circuit level components	34	22	22	6	0
G 501		G3-14 Do you perform tasks on shift registers in logic circuits	73	29	32	15	1
G 502		G3-15 Do you perform tasks on storage registers in logic circuits	71	30	31	15	1
G 503		G3-16 Do you trace data flow through combinational logic circuits	46	28	31	20	2
G 504		G3-17 Do you troubleshoot to isolate a faulty combinational logic circuit	41	27	26	16	2
G 505		G3-18 Do you troubleshoot combinational logic circuits to circuit level components	20	23	20	7	1
G 506		G3-19 Do you perform tasks on encoders	49	30	35	23	5
G 507		G3-20 Do you perform tasks on decoders	49	31	35	21	5
G 508		G3-21 Do you perform tasks on multiplexers	64	40	30	14	21
G 509		G3-22 Do you perform tasks on demultiplexers	17	37	21	8	19
G 510		G3-23 Do you perform tasks on comparators	53	24	20	9	2
G 511		G3-24 Do you perform tasks on parity generators or checkers	46	22	20	8	3
G 512		G3-25 Do you perform tasks on code converters	17	18	12	6	3
G 513		G3-26 Do you perform tasks on adders	42	22	14	7	0
G 514		G3-27 Do you perform tasks on subtractors	42	18	14	5	0
G 515		G3-28 Do you perform tasks on count detect circuits	24	16	10	6	0

0035 VII 4. G4 Digital to Analog (D/A) and Analog to Digital (A/Converters

G 516		G4-1 Do you trace data flow through A/D converters	86	28	37	23	25
G 517		G4-2 Do you trace data flow through D/A converters	85	24	36	22	26
G 518		G4-3 Do you troubleshoot A/D converter circuits	75	27	30	15	26
G 519		G4-4 Do you troubleshoot D/A converter circuits	76	23	31	16	27
G 520		G4-5 Do the converters you perform tasks on use flash conversion	5	2	4	1	1
G 521		G4-6 Do the converters you perform tasks on use successive approximation conversion	24	6	9	1	1
G 522		G4-7 Do the converters you perform tasks on use ramp conversion	15	5	12	2	1
G 523		G4-8 Do the converters you perform tasks on use R2R conversion	7	4	2	3	1

D	T Tsk	Y Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50

# 0037 VIII. Transmission/Reception Circuits, Devices, and Systems

## 0038 VIII 1. H1 Connections

H 524	H1-1 Do you measure electrical length on transmission lines	41	16	15	14	9
H 525	H1-2 Do you measure physical length on transmission lines	31	29	19	15	9
H 526	H1-3 Do you measure standing wave ratio (SWR) on transmission lines	63	45	28	29	8
H 527	H1-4 Do you construct transmission lines	22	31	25	13	14
H 528	H1-5 Do you match transmission line impedance with loads	39	31	21	14	22
H 529	H1-6 Do you calculate the characteristic impedance (ZO) of transmission lines	22	17	8	7	16
H 530	H1-7 Do you troubleshoot transmission lines	54	48	35	33	52
H 531	H1-8 Do you perform tasks on open-wire transmission lines	15	16	17	8	16
H 532	H1-9 Do you perform tasks on twisted pair transmission lines	36	20	33	15	47
H 533	H1-10 Do you perform tasks on twin lead transmission lines	12	17	12	5	11
H 534	H1-11 Do you perform tasks on flexible coaxial transmission lines	75	48	54	51	29
H 535	H1-12 Do you perform tasks on rigid coaxial transmission lines	76	33	35	31	9
H 536	H1-13 Do you perform tasks on fiber-optic transmission lines	32	6	6	3	14
H 537	H1-14 Do you trace schematic or block diagrams of circuits containing waveguides	86	11	45	42	2
H 538	H1-15 Do you troubleshoot circuits to isolate a faulty waveguide assembly	88	10	43	40	2
H 539	H1-16 Do you pressurize or purge waveguide assemblies	92	8	31	6	1
H 540	H1-17 Do you measure standing wave ratio for waveguide assemblies	78	5	24	22	1
H 541	H1-18 Do you remove or install waveguide or associated coupling hardware components	90	10	51	45	3

## 0039 VIII 2. H2 Microwave Oscillators and Amplifiers

H 542	H2-1 Do you trace schematic or block diagrams of circuits containing microwave oscillators or amplifiers	76	4	32	37	2
H 543	H2-2 Do you troubleshoot circuits to isolate a faulty microwave oscillator or amplifier	73	4	31	32	3
H 544	H2-3 Do you tune or adjust microwave oscillators or amplifiers	63	4	27	27	2
H 545	H2-4 Do you perform tasks on two-cavity klystron microwave oscillators and amplifiers	37	1	4	2	0

D	T	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
H 546		H2-5 Do you perform tasks on three-cavity klystron microwave oscillators and amplifiers	53	0	3	1	0
H 547		H2-6 Do you perform tasks on reflex klystron microwave oscillators and amplifiers	14	0	4	2	0
H 548		H2-7 Do you perform tasks on traveling wave tube microwave oscillators and amplifiers	69	0	29	35	1
H 549		H2-8 Do you perform tasks on magnetron microwave oscillators and amplifiers	12	0	14	7	0
H 550		H2-9 Do you perform tasks on backward wave oscillator	3	0	16	4	0
H 551		H2-10 Do you perform tasks on parametric amplifiers	44	1	6	1	0
H 552		H2-11 Do you perform tasks on yttrium iron garnet (YIG) tuned microwave oscillators and amplifiers	0	2	23	10	0
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0040		VIII 3. H3 Resonant Cavities					
H 553		H3-1 Do you trace schematic or block diagrams of circuits containing resonant cavities	34	49	12	8	1
H 554		H3-2 Do you troubleshoot circuits to isolate a faulty resonant cavity	27	48	10	6	1
H 555		H3-3 Do you tune or adjust resonant cavities electrically	27	48	7	5	0
H 556		H3-4 Do you tune or adjust resonant cavities physically	3	47	6	3	1
H 557		H3-5 Do you measure frequency of resonant cavities	15	35	8	7	1
H 558		H3-6 Do you perform tasks on probe resonant cavities	7	14	5	3	0
H 559		H3-7 Do you perform tasks on loop resonant cavities	10	18	4	2	0
H 560		H3-8 Do you perform tasks on aperture (iris/window) resonant cavities	8	10	6	0	0
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0041		VIII 4. H4 Transmitters and Receivers					
H 561		H4-1 Do you use "AM" modulation principles	12	80	35	34	15
H 562		H4-2 Do you trace block diagrams of AM transmitters	10	87	34	30	3
H 563		H4-3 Do you trace block diagrams of AM transmitter subassemblies or circuit cards	8	75	27	28	2
H 564		H4-4 Do you trace schematic diagrams of AM transmitter subassemblies or circuit cards	8	67	25	23	1
H 565		H4-5 Do you troubleshoot AM transmitters to major units	8	90	27	26	3
H 566		H4-6 Do you troubleshoot AM transmitters to subassemblies or circuit cards	8	69	26	24	1
H 567		H4-7 Do you troubleshoot AM transmitter subassemblies or circuit cards to circuit level components	7	59	19	13	1
H 568		H4-8 Do you align or adjust AM transmitters or circuits	5	88	26	23	3
H 569		H4-9 Do you calculate percentage of modulation for AM transmitters	3	53	12	12	3
H 570		H4-10 Do you use "AM" demodulation principles	7	78	30	14	12
H 571		H4-11 Do you trace block diagrams of AM receivers	7	86	35	18	2

D	T Task	Y Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
H 572	H4-12 Do you trace block diagrams of AM receiver subassemblies or circuit cards	7	72	29	12	1		
H 573	H4-13 Do you trace schematic diagrams of AM receiver subassemblies or circuit cards	7	67	27	11	0		
H 574	H4-14 Do you troubleshoot AM receivers to major units	7	86	31	15	5		
H 575	H4-15 Do you troubleshoot AM receivers to subassemblies or circuit cards	7	63	27	10	1		
H 576	H4-16 Do you troubleshoot AM receiver subassemblies or circuit cards to circuit level components	2	53	17	7	0		
H 577	H4-17 Do you align or adjust AM receivers or circuits	5	81	24	9	1		
H 578	H4-18 Do you trace block diagrams of single side band (SSB) transmitters	7	29	3	5	3		
H 579	H4-19 Do you trace block diagrams of SSB transmitter subassemblies or circuit cards	5	24	3	3	0		
H 580	H4-20 Do you trace schematic diagrams of SSB transmitter subassemblies or circuit cards	5	19	4	3	0		
H 581	H4-21 Do you troubleshoot SSB transmitters to major units	5	29	4	4	5		
H 582	H4-22 Do you troubleshoot SSB transmitters to subassemblies or circuit cards	5	18	4	3	1		
H 583	H4-23 Do you troubleshoot SSB transmitter subassemblies or circuit cards to circuit level components	5	17	4	3	2		
H 584	H4-24 Do you align or adjust SSB transmitters or circuits	2	19	4	4	4		
H 585	H4-25 Do you calculate percentage of modulation for SSB transmitters	2	12	3	3	1		
H 586	H4-26 Do you trace block diagrams of SSB receivers	5	28	8	8	2		
H 587	H4-27 Do you trace block diagrams of SSB receiver subassemblies or circuit cards	3	23	7	5	0		
H 588	H4-28 Do you trace schematic diagrams of SSB receiver subassemblies or circuit cards	3	18	6	4	0		
H 589	H4-29 Do you troubleshoot SSB receivers to major units	3	28	6	5	4		
H 590	H4-30 Do you troubleshoot SSB receivers to sub-assemblies or circuit cards	3	17	4	4	1		
H 591	H4-31 Do you troubleshoot SSB receiver subassemblies or circuit cards to circuit level components	3	16	5	4	2		
H 592	H4-32 Do you align or adjust SSB receivers or circuits	3	19	5	4	3		
H 593	H4-33 Do you use "FM" modulation principles	24	90	41	34	21		
H 594	H4-34 Do you trace block diagrams of FM transmitters	22	93	37	32	6		
H 595	H4-35 Do you trace block diagrams of FM transmitter subassemblies or circuit cards	22	78	31	30	3		
H 596	H4-36 Do you trace schematic diagrams of FM transmitter subassemblies or circuit cards	19	75	27	27	2		
H 597	H4-37 Do you troubleshoot FM transmitters to major units	19	90	31	30	13		
H 598	H4-38 Do you troubleshoot FM transmitters to sub-assemblies or circuit cards	17	70	29	26	5		
H 599	H4-39 Do you troubleshoot FM transmitter subassemblies or circuit cards to circuit level components	10	59	20	14	3		
H 600	H4-40 Do you align or adjust FM transmitters or circuits	15	87	28	25	7		
H 601	H4-41 Do you calculate modulation index for FM transmitters	7	41	9	8	2		
H 602	H4-42 Do you measure frequency deviation for FM transmitters	17	78	20	25	13		
H 603	H4-43 Do you use "FM" demodulation principles	12	86	35	20	18		

D T Y	Task Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
H 604		H4-44 Do you trace block diagrams of FM receivers	17	89	44	23	6
H 605		H4-45 Do you trace block diagrams of FM receiver subassemblies or circuit cards	17	77	38	18	3
H 606		H4-46 Do you trace schematic diagrams of FM receiver subassemblies or circuit cards	14	72	33	17	2
H 607		H4-47 Do you troubleshoot FM receivers to major units	14	90	37	20	12
H 608		H4-48 Do you troubleshoot FM receivers to subassemblies or circuit cards	14	70	34	16	5
H 609		H4-49 Do you troubleshoot FM receiver subassemblies or circuit cards to circuit level components	5	57	21	10	3
H 610		H4-50 Do you align or adjust FM receivers or circuits	8	89	28	14	8
H 611		H4-51 Do you plot receiver signal level curves (RSL) for FM receivers	5	29	10	4	10
H 612		H4-52 Do you use "PM" modulation principles	46	6	31	24	12
H 613		H4-53 Do you trace block diagrams of PM transmitters	59	5	28	23	2
H 614		H4-54 Do you trace block diagrams of PM transmitter subassemblies or circuit cards	58	5	23	21	0
H 615		H4-55 Do you trace schematic diagrams of PM transmitter subassemblies or circuit cards	53	5	21	20	0
H 616		H4-56 Do you troubleshoot PM transmitters to major units	58	4	23	20	3
H 617		H4-57 Do you troubleshoot PM transmitters to sub-assemblies or circuit cards	56	4	21	20	1
H 618		H4-58 Do you troubleshoot PM transmitter subassemblies or circuit cards to circuit level components	27	4	13	7	1
H 619		H4-59 Do you align or adjust PM transmitters or circuits	46	4	19	20	3
H 620		H4-60 Do you calculate pulse recurrence time (PRT) or pulse recurrence frequency (PRF) for PM transmitters	56	5	15	19	1
H 621		H4-61 Do you measure PRT, PRF or pulse width for PM transmitters	61	5	19	23	1
H 622		H4-62 Do you use "PM" demodulation principles	39	4	25	17	9
H 623		H4-63 Do you trace block diagrams of PM receivers	53	4	27	21	1
H 624		H4-64 Do you trace block diagrams of PM receiver subassemblies or circuit cards	51	4	19	18	0
H 625		H4-65 Do you trace schematic diagrams of PM receiver subassemblies or circuit cards	46	4	19	13	0
H 626		H4-66 Do you troubleshoot PM receivers to major units	51	4	21	16	3
H 627		H4-67 Do you troubleshoot PM receivers to subassemblies or circuit cards	47	4	18	14	0
H 628		H4-68 Do you troubleshoot PM receiver subassemblies or circuit cards to circuit level components	24	4	9	6	1
H 629		H4-69 Do you align or adjust PM receivers or circuits	44	4	19	13	2
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0042		VIII 5. H5 Antennas					
H 630		H5-1 Do you physically align antennas	12	16	13	15	5
H 631		H5-2 Do you electrically align antennas	36	17	10	7	4
H 632		H5-3 Do you troubleshoot loading of antennas	27	41	15	16	3
H 633		H5-4 Do you troubleshoot coupling of antennas	39	41	24	26	3

D	T Ysk	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
H 634		H5-5 Do you plot graph radiation patterns	12	0	4	1	1
H 635		H5-6 Do you troubleshoot antenna components	61	47	22	24	2
H 636		H5-7 Do you measure standing wave ratio (SWR) for antennas	61	58	25	22	2
H 637		H5-8 Do you work with Yagi antennas	3	6	0	2	2
H 638		H5-9 Do you work with dipole antennas	53	58	27	20	6
H 639		H5-10 Do you work with slotted antennas	44	5	13	5	0
H 640		H5-11 Do you work with rotary antennas	31	1	9	6	3
H 641		H5-12 Do you work with hertz antennas	2	4	1	0	0
H 642		H5-13 Do you work with marconi antennas	0	4	2	1	1
H 643		H5-14 Do you work with rhombic antennas	0	5	4	1	4
H 644		H5-15 Do you work with scimitar antennas	0	1	28	6	0
H 645		H5-16 Do you work with parabolic antennas	7	19	12	14	7
H 646		H5-17 Do you work with ground plane antennas	3	23	11	7	5
H 647		H5-18 Do you perform tasks on rotary antenna arrays	31	1	6	2	1
H 648		H5-19 Do you perform tasks on stacked (end fire) antenna arrays	10	1	4	2	0
H 649		H5-20 Do you perform tasks on broadside antenna arrays	5	1	3	0	1
H 650		H5-21 Do you perform tasks on cardioid antenna arrays	3	2	3	1	0
H 651		H5-22 Do you perform tasks on collinear antenna arrays	0	4	2	3	0
H 652		H5-23 Do you perform tasks on phase antenna arrays	73	6	9	15	0
H 653		H5-24 Do you perform tasks on planar antenna arrays	8	5	3	2	1
H 654		H5-25 Do you perform tasks on antennas with vertical polarization	53	23	27	30	6
H 655		H5-26 Do you perform tasks on antennas with horizontal polarization	53	24	24	23	6
H 656		H5-27 Do you perform tasks on antennas with circular polarization	27	22	23	36	1
H 657		H5-28 Do you perform tasks on antennas with unidirectional radiation patterns	47	34	26	33	8
H 658		H5-29 Do you perform tasks on antennas with bidirectional radiation patterns	19	37	18	13	6
H 659		H5-30 Do you perform tasks on antennas with omnidirectional radiation patterns	41	65	30	41	7

0043 IX. Radio Frequency (RF) Measurements or Calculations

0044 IX 1. I1 RF Measurements

I 660	I1-1 Do you measure RF power	92	93	57	65	10
I 661	I1-2 Do you measure RF peak power	88	55	43	49	5
I 662	I1-3 Do you measure RF average power	95	48	36	40	5
I 663	I1-4 Do you measure RF effective power	46	40	24	24	5
I 664	I1-5 Do you measure RF output power using wattmeters	83	84	39	36	5

D  
T Task  
Y Nbr

Task Title

455 455 456 493  
X4 X6 X1A X1B 50

## 0045 IX 2. I2 RF Calculations

I 665 I2-1 Do you calculate RF apparent power 22 19 14 15 2  
I 666 I2-2 Do you calculate RF true power 25 19 19 14 2  
I 667 I2-3 Do you calculate RF power loss or gain in db 86 42 50 50 6

## 0046 X. Additional Circuits, Devices, Systems, or Items

## 0047 X 1. J1 Microphones and Speakers

J 668 J1-1 Do you trace block diagrams of circuits containing microphones 2 60 13 5 2  
J 669 J1-2 Do you trace schematic diagrams of microphone circuits 0 52 11 2 1  
J 670 J1-3 Do you troubleshoot to isolate a faulty microphone 0 61 15 3 3  
J 671 J1-4 Do you troubleshoot microphones 0 43 3 1 1  
J 672 J1-5 Do you work on carbon microphones 2 41 3 2 3  
J 673 J1-6 Do you work on capacitor microphones 2 8 0 2 0  
J 674 J1-7 Do you work on crystal microphones 2 12 1 0 1  
J 675 J1-8 Do you work on dynamic microphones 2 45 6 0 3  
J 676 J1-9 Do you work on velocity ribbon microphones 0 5 1 0 0  
J 677 J1-10 Do you trace block diagrams of circuits containing speakers 0 61 12 9 3  
J 678 J1-11 Do you trace schematic diagrams of speaker circuits 0 51 11 6 2  
J 679 J1-12 Do you troubleshoot to isolate a faulty speaker 0 64 14 7 8  
J 680 J1-13 Do you troubleshoot speakers 0 43 3 2 6

## 0048 X 2. J2 Photosensitive Devices

J 681 J2-1 Do you trace block diagrams of circuits containing photosensitive devices 17 11 8 7 0  
J 682 J2-2 Do you trace schematic diagrams of photosensitive device circuits 8 11 9 6 0  
J 683 J2-3 Do you troubleshoot to isolate a faulty photosensitive device 14 11 9 6 0  
J 684 J2-4 Do you adjust or calibrate photosensitive devices 2 5 8 4 0  
J 685 J2-5 Do you work on photodiodes 5 8 4 4 0  
J 686 J2-6 Do you work on phototransistors 5 8 4 3 0  
J 687 J2-7 Do you work on phototubes 0 0 2 1 0  
J 688 J2-8 Do you work on photo-SCRs 0 0 2 1 0

D	Tsk	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
J 689	J2-9	Do you work on photocells (Photoconductive or Photovoltaic)	8	5	4	4	0

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0049	X 3.	J3 Storage Type Display Tubes	5	4	6	2	0
J 690	J3-1	Do you trace block diagrams of circuits containing display tubes	5	4	6	2	0
J 691	J3-2	Do you trace schematic diagrams of display tubes or circuits	5	2	6	0	0
J 692	J3-3	Do you troubleshoot to isolate a faulty display tube	3	6	5	0	0
J 693	J3-4	Do you adjust or calibrate display tubes or circuits	0	10	4	0	0
J 694	J3-5	Do you work on direct view storage tubes (DVST)	0	5	6	1	0
J 695	J3-6	Do you work on multiple mode storage tubes (MHST)	2	0	4	0	0
J 696	J3-7	Do you work on scan converter tubes (SCT)	0	0	3	0	0

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0050	X 4.	J4 Television, Laser, and Infrared Systems	0	0	2	2	0
J 697	J4-1	Do you trace block diagrams of TV systems or subassemblies	0	0	2	2	0
J 698	J4-2	Do you trace schematic diagrams of TV systems or component circuits	0	0	1	1	0
J 699	J4-3	Do you troubleshoot TV systems to major subassemblies	0	0	2	1	0
J 700	J4-4	Do you troubleshoot TV systems to circuit level components	0	1	1	3	0
J 701	J4-5	Do you adjust or calibrate TV systems or components	0	0	2	2	0
J 702	J4-6	Do you trace block diagrams of laser systems or subassemblies	0	0	1	2	0
J 703	J4-7	Do you trace schematic diagrams of laser systems or component circuits	0	0	1	1	0
J 704	J4-8	Do you troubleshoot laser systems to major subassemblies	0	0	1	1	0
J 705	J4-9	Do you troubleshoot laser systems to circuit level components	0	0	1	1	0
J 706	J4-10	Do you adjust or calibrate laser systems or components	0	0	1	1	0
J 707	J4-11	Do you trace block diagrams of infrared systems or subassemblies	0	1	12	2	0
J 708	J4-12	Do you trace schematic diagrams of infrared systems or component circuits	0	1	9	1	0
J 709	J4-13	Do you troubleshoot infrared systems to major subassemblies	0	1	11	1	0
J 710	J4-14	Do you troubleshoot infrared systems circuit level components	0	1	8	1	0



D T Y	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
J 711	J4-15 Do you inspect, clean, or service infrared systems or components	0	1	12	1	0
J 712	J4-16 Do you adjust or calibrate infrared systems or components	0	0	8	1	0

0051 Tasks not referenced

Report Option Table for Modules

Option	Status
Primary Sort	Inventory Sequence
Secondary Sort	Not Used
Print Suppress	Not Used

Report Option Table for Tasks

Option	Status
Primary Sort	Inventory Sequence
Secondary Sort	Not Used
Print Suppress	Not Used

Description of Reported Module Factors

Col	Factor	Source vector	Title	Module Statement	Number Members	Mean	S.D.	Max	Based on All Tasks Within Range	Min	Valid
1	TITLE										

Description of Reported Task Factors

Col	Factor	Source vector	Title	Task Statement	Number Members	Mean	S.D.	Max	Based on All Tasks Within Range	Min	Valid
1	TITLE										
2	F0014	GP0014/PHP		A11 DAFSC 30351	278	45.58	27.00	97.84	.36	.36	712
3	F0015	GP0015/PHP		A11 DAFSC 30352	139	36.06	25.12	98.56	.72	.72	712
4	F0016	GP0016/PHP		A11 DAFSC 30353	186	34.69	24.04	98.92	1.08	1.08	712
5	F0038	GP0041/PHP		A11 DAFSC 30450	240	26.65	23.10	97.50	.00	.00	712
6	F0039	GP0042/PHP		A11 DAFSC 30451	171	37.50	27.49	97.66	.00	.00	712
7	F0040	GP0043/PHP		A11 DAFSC 30454	297	34.75	26.12	96.97	.00	.00	712
8	F0017	GP0020/PHP		A11 DAFSC 30456	212	22.36	19.51	93.87	.94	.94	712
9	F0018	GP0021/PHP		A11 DAFSC 30554	985	24.20	24.02	97.16	.00	.00	712
10	F0088	GP0111/PHP		A11 DAFSC 455X1A	212	12.02	18.72	98.58	.00	.00	712
11	F0089	GP0112/PHP		A11 DAFSC 455X1B	169	11.59	18.15	98.82	.00	.00	712
12	F0090	GP0113/PHP		A11 DAFSC 455X1C	172	10.89	17.26	97.67	.00	.00	712

Col	Factor	Source vector	Title	Number Members	----- Based on All Tasks Within Range -----		
					Mean	S.D.	Max Min Valid
13	F0091	GP0114/PHP	All DAFSC 455X2A	193	30.27	23.35	98.45 .00 712
14	F0092	GP0115/PHP	All DAFSC 455X2B	148	20.78	18.38	97.97 .00 712
15	F0093	GP0116/PHP	All DAFSC 455X2C	87	21.43	20.52	98.85 .00 712

Electronic Principles Inventory (EPI) data for Air Force specialties is presented below in Electronic Fundamentals/Applications order. Data for this report was collected from job incumbents during the period March 1987 - September 1988

Percent members responding "YES" is shown for each specialty listed. Where skill level is not specified, both 5 and 7 skill levels are included (e.g., DAFSC 000X0 includes 00050 and 00070).

For assistance in using this EPI printout phone USAFOMC/OMYA,  
at AUTOVON 487-6623.

D												
T	Tsk											
Y	Nbr	Task Title										
303	303	303	304	304	304	305	455	455	455	455	455	455
51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B X2C

0001 STS 1 Electronic Fundamentals/  
Applications dated 20 Feb 1987

## 0002 1. Basic Terms

0003 1a. Metric Notation B

A 1 A1-1 Do you use metric terms (example milli, kilo, mega)

**0004 1b. DC Terns**

A	2	A1-2	Do you use basic DC electrical/electronic terms	98	99	99	98	97	97	94	96	98	95	94	98	97	97
---	---	------	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----

**0005** **1c. AC Terms** **B**

A	3	Al-3 Do you use basic AC electrical/electronic terms		98	97	99	96	97	97	93	91	98	96	94	98	97	97
---	---	--	--	----	----	----	----	----	----	----	----	----	----	----	----	----	----

**0006 2. Basic Circuits**

D  
 T Task  
 Y Nbr

Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
 51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0007 2a. Theory of operation B

A 4 A1-4 Do you trace schematic or block diagrams of circuits  
 containing conductors, fuses, lamps, switches, or batteries 95 90 92 96 96 94 86 93 98 95 95 95 95 98

0008 2b. Troubleshoot circuits 2b

A 5 A1-5 Do you troubleshoot circuits containing conductors,  
 fuses, lamps, switches, or batteries 94 89 91 93 92 93 83 89 96 95 94 93 91 97

0009 3. Basic Circuit Calculations

0010 3a. DC B

A 6 A1-6 Do you calculate values of DC voltage, current, resist-  
 ance, or power 70 67 72 54 75 62 47 47 32 38 35 54 43 37  
 A 12 A1-12 Do you calculate the value of a resistor required  
 for a circuit 46 50 68 47 56 45 29 30 23 21 22 42 26 26

0011 3b. AC B

A 7 A1-7 Do you calculate values of AC effective voltage,  
 average voltage, or peak-to-peak voltage 64 64 65 50 71 59 44 44 26 31 30 53 41 33  
 A 8 A1-8 Do you calculate values of frequency, phase  
 relationship, or wave length 68 61 69 53 79 62 48 52 26 28 28 56 41 41

0012 4. Resistors

0013 4a. Theory of operation B

A 9 A1-9 Do you trace schematic or block diagrams of circuits  
 containing resistors 94 86 90 88 93 88 70 80 78 75 78 90 78 82

D Task  
 T Nbr  
 Y Nbr

Task Title

303 303 303 304 304 304 305 455 455 455 455 455 455  
 51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

A 11 A1-11 Do you calibrate or adjust circuits by using  
 variable resistors

92 85 90 84 92 85 74 77 67 62 63 82 59 69

0014 4b. Isolate faulty resistors 2b

A 10 A1-10 Do you troubleshoot circuits to isolate a faulty  
 resistor

88 83 89 82 90 83 57 69 65 51 49 85 61 61

A 14 A1-14 Do you ohm check resistors

90 84 89 85 91 84 61 74 71 63 62 89 65 70

0015 4c. Color code B

A 13 A1-13 Do you determine ohmic value of a resistor using  
 the color code

80 81 90 72 87 82 49 57 46 34 38 74 55 55

0016 5. Relays/Solenoids

0017 5a. Relay theory of operation B

A 15 A1-15 Do you trace schematic or block diagrams of circuits  
 containing relays

94 84 89 85 92 87 69 74 96 89 91 95 92 94

A 17 A1-17 Do you adjust relays

41 55 50 46 55 44 26 31 21 18 14 39 25 17

A 18 A1-18 Do you perform tasks on contacts, cores, coils,  
 armatures, or springs

47 59 58 44 62 60 29 37 29 24 19 46 29 32

0018 5b. Isolate faulty relays 2b

A 16 A1-16 Do you troubleshoot circuits to isolate a faulty  
 relay

91 81 88 81 91 85 59 70 96 88 85 93 89 93

A 19 A1-19 Do you continuity check relays

86 75 83 68 82 80 56 57 84 76 78 88 79 86

0019 5c. Solenoid theory of operation -

A 77 A2-33 Do you trace schematic or block diagrams of circuits  
 containing solenoids

26 18 41 16 9 39 29 35 50 50 47 41 30 17

A 79 A2-35 Do you perform maintenance on solenoid component parts

15 12 30 9 5 29 18 19 17 12 12 12 11 7

D T Task  
 Y Nbr Task Title  
 303 303 303 304 304 304 304 305 455 455 455 455 455 455 455  
 51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0020 5d. Isolate faulty solenoids

A 78 A2-34 Do you troubleshoot circuits to isolate a faulty solenoid 24 17 39 15 8 38 27 35 48 43 40 28 15

0021 6. Inductors

0022 6a. Theory of operation B

A 20 A1-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils 86 76 83 71 83 85 51 47 35 39 42 75 51 63  
 A 25 A1-25 Do you calibrate or adjust circuits by using variable inductors 69 56 57 49 68 67 28 25 11 14 12 58 32 34

0023 6b. Isolate faulty inductors 2b

A 21 A1-21 Do you troubleshoot circuits to isolate a faulty inductor, choke, or choke coil 79 71 81 62 78 78 39 39 25 23 28 69 38 38  
 A 26 A1-26 Do you ohm check inductors 74 68 76 58 61 72 39 33 26 27 27 62 34 43

0024 6c. Calculations B

A 22 A1-22 Do you calculate values of circuit total inductance 31 29 38 26 30 26 16 11 7 8 8 21 11 13  
 A 23 A1-23 Do you calculate values of circuit or component inductive reactance 26 29 34 24 29 25 13 10 7 8 8 20 10 13  
 A 24 A1-24 Do you calculate values of circuit voltage or current in circuits containing inductors 36 38 49 30 37 35 18 15 8 8 9 26 16 15

0025 7. Capacitors

D  
 T Task  
 Y Nbr  
 Task Title  
 303 303 303 304 304 304 304 305 455 455 455 455 455 455  
 51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0026 7a. Theory of operation B

A 27 A1-27 Do you trace schematic or block diagrams of  
 circuits containing capacitors 93 83 90 86 93 86 71 80 75 74 72 86 65 74  
 A 32 A1-32 Do you calibrate or adjust circuits using variable  
 capacitors 79 61 63 57 77 76 34 38 28 26 23 60 35 41

0027 7b. Isolate faulty capacitors 2b

A 28 A1-28 Do you troubleshoot circuits to isolate a faulty  
 capacitor 88 81 87 80 91 82 58 72 65 49 51 80 54 52  
 A 33 A1-33 Do you ohm check capacitors 78 73 82 68 77 74 51 65 49 39 45 76 46 52

0028 7c. Calculations

A 29 A1-29 Do you calculate values of circuit total capacitance 35 34 44 27 36 29 24 23 31 23 22 22 13 17  
 A 30 A1-30 Do you calculate values of circuit or component  
 capacitive reactance 29 32 37 27 33 26 19 18 18 15 15 22 11 17  
 A 31 A1-31 Do you calculate values of circuit or component  
 voltage or current in circuits containing capacitors 38 42 49 33 43 36 25 20 17 16 28 19 21

0029 7d. Color code B

A 34 A1-34 Do you use capacitor color codes in your present  
 job 29 30 41 20 31 26 14 16 10 9 9 20 14 10

0030 8. Transformers

0031 8a. Theory of operation B

A 35 A1-35 Do you trace schematic or block diagrams of circuits  
 containing transformers 91 82 89 82 91 86 66 71 64 76 69 84 65 72  
 A 39 A1-39 Do you calibrate or adjust circuits using variable  
 transformers 51 53 49 40 48 47 34 20 15 17 10 39 26 22



D  
T Task  
Y Nbr

Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0032 8b. Isolate faulty transformers 2b

A 36 A1-36 Do you troubleshoot circuits to isolate a faulty transformer 86 80 88 77 88 81 56 65 56 63 55 79 53 55  
A 40 A1-40 Do you ohm check transformers 72 77 77 63 73 76 44 49 42 47 41 67 47 49  
A 41 A1-41 Do you measure transformer output voltage 82 78 85 73 85 80 53 63 50 56 51 76 50 62

0033 8c. Calculations

A 37 A1-37 Do you calculate transformer voltage or current step-up or step-down ratios 45 51 56 33 44 43 28 25 18 18 17 32 22 20  
A 38 A1-38 Do you calculate impedance of transformers 28 28 34 25 28 26 15 14 7 9 8 20 11 13

0034 9. Three Phase Transformers

0035 9a. Theory of operation B

A 42 A1-42 Do you trace schematic or block diagrams of circuits containing three phase transformers 77 68 65 47 70 42 43 36 32 47 44 49 28 38  
A 44 A1-44 Do you adjust three phase transformers 41 45 41 26 29 26 30 14 9 11 9 22 11 10

0036 9b. Isolate faulty three phase transformers

A 43 A1-43 Do you troubleshoot circuits to isolate a faulty three phase transformer 72 65 62 41 63 40 39 30 30 43 33 42 25 31

0037 10. DC Motors

0038 10a. Theory of operation B

A 45 A2-1 Do you trace schematic or block diagrams of circuits containing DC motors 72 55 76 25 46 61 58 53 58 53 43 70 46 45

D T Y	Task Title																
		303	303	303	304	304	304	304	304	305	455	455	455	455	455	455	455
A 48	A2-4 Do you perform tasks on DC motor component parts	51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C		
		35	34	45	14	19	30	29	22	17	15	12	.2	13	9		
0039	10b. Isolate faulty DC motors	2b															
A 46	A2-2 Do you troubleshoot circuits to isolate a faulty DC motor	70	52	74	23	44	59	54	52	56	46	34	69	42	39		
0040	10c. Troubleshoot motors	2b															
A 47	A2-3 Do you troubleshoot DC motor component parts	37	34	51	14	22	33	29	21	20	17	14	24	18	9		
0041	11. AC Motors																
0042	11a. Theory of operation	B															
A 49	A2-5 Do you trace schematic or block diagrams of circuits containing AC motors	68	71	73	28	65	55	47	46	55	54	41	62	39	43		
A 52	A2-8 Do you perform tasks on AC motor component parts	37	40	47	14	26	27	22	20	13	17	9	17	9	7		
0043	11b. Isolate faulty AC motors	2b															
A 50	A2-6 Do you troubleshoot circuits to isolate a faulty AC motor	65	68	72	26	60	53	42	45	53	48	33	60	34	36		
0044	11c. Troubleshoot motors	2b															
A 51	A2-7 Do you troubleshoot AC motor component parts	36	41	49	14	29	30	21	20	16	17	9	19	9	7		
0045	12. DC Generators																

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T Task  
Y Nbr

303 303 303 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

Task Title

0046 12a. Theory of operation

A 53 A2-9 Do you trace schematic or block diagrams of circuits containing DC generators 16 24 38 11 12 13 15 9 32 28 26 18 10 10  
A 56 A2-12 Do you perform tasks on component parts of DC generators 12 19 28 8 7 9 6 5 10 7 7 9 5 3

0047 12b. Isolate faulty DC generators

A 54 A2-10 Do you troubleshoot to isolate a faulty DC generator 15 23 37 12 12 12 12 8 29 24 17 15 8 8

0048 12c. Troubleshoot DC generators

A 55 A2-11 Do you troubleshoot DC generator component parts 12 20 29 7 7 9 6 5 10 5 7 9 5 3

0049 13. AC Generators

0050 13a. Theory of operation

A 57 A2-13 Do you trace schematic or block diagrams of circuits containing AC generators 14 23 45 11 9 12 15 8 31 27 28 15 7 10  
A 60 A2-16 Do you perform tasks on component parts of AC generators 11 18 34 8 5 8 8 4 8 7 8 8 3 2

0051 13b. Isolate faulty AC generators

A 58 A2-14 Do you troubleshoot circuits to isolate a faulty AC generator 15 23 43 10 9 12 15 7 28 22 19 13 6 9

0052 13c. Troubleshoot AC generators

A 59 A2-15 Do you troubleshoot AC generator component parts 10 18 34 7 4 9 7 4 10 6 8 8 3 2

D  
 T Task  
 Y Mbr  
 Task Title  
 303 303 303 304 304 304 304 305 455 455 455 455 455 455  
 51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0053 14. Alternators

0054 14a. Theory of operation

A 61 A2-17 Do you trace schematic or block diagrams of circuits containing alternators 4 4 8 4 2 5 6 2 4 2 5 4 3 3  
 A 64 A2-20 Do you perform tasks on component parts of alternators 3 3 5 2 2 3 2 1 1 1 2 2 1 0

0055 14b. Isolate faulty alternators

A 62 A2-18 Do you troubleshoot circuits to isolate a faulty alternator 4 3 7 4 2 4 5 1 4 2 3 3 1 2

0056 14c. Troubleshoot alternators

A 63 A2-19 Do you troubleshoot alternator component parts 3 3 8 2 2 3 2 1 2 1 2 2 1 0

0057 15. Synchro/Servos

0058 15a. Theory of operation B

A 65 A2-21 Do you trace schematic or block diagrams of circuits containing synchros or servos 73 71 83 18 16 53 58 34 88 87 76 66 49 51  
 A 68 A2-24 Do you perform tasks on component parts of synchros or servos 55 47 63 13 9 31 34 17 33 37 22 27 16 13

0059 15b. Isolate faulty synchro/servos 2b

A 66 A2-22 Do you troubleshoot circuits to isolate a faulty synchro or servo 71 70 83 17 16 51 55 33 88 81 68 65 43 43

D  
T Task  
Y Nbr

Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0060 15c. Troubleshoot synchro/servos 2b

A 67 A2-23 Do you troubleshoot synchro or servo component parts 57 50 66 10 10 33 38 18 42 41 33 32 21 13

0061 16. Choppers (Synchronous Vibrators)

0062 16a. Theory of operation B

A 69 A2-25 Do you trace schematic or block diagrams of circuits containing choppers 10 19 18 4 5 14 6 4 13 16 13 26 10 16

0063 16b. Isolate faulty choppers 2b

A 70 A2-26 Do you troubleshoot circuits to isolate a faulty chopper 9 19 16 3 4 14 5 4 12 12 10 25 6 16  
A 71 A2-27 Do you measure chopper coil excitation frequency 5 15 11 2 3 9 3 2 7 2 6 11 4 8  
A 72 A2-28 Do you measure chopper coil voltage-current phase relationship 5 14 11 2 3 7 3 3 7 2 5 10 3 8

0064 17. Transducers

0065 17a. Theory of operation B

A 73 A2-29 Do you trace schematic or block diagrams of circuits containing transducers 14 11 13 14 6 14 11 19 52 54 42 13 5 8  
A 75 A2-31 Do you calibrate or adjust transducers 9 8 7 9 1 11 6 14 24 20 15 7 1 0  
A 76 A2-32 Do you repair, clean or lubricate transducers 9 8 8 10 3 13 7 14 15 15 12 7 1 0

0066 17b. Isolate faulty transducers 2b

A 74 A2-30 Do you troubleshoot circuits to isolate a faulty transducer 12 9 10 13 5 14 9 19 50 53 38 13 3 7

D	T Task	Task Title	303	303	303	304	304	304	304	305	455	455	455	455	455
Y Nbr			51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B X2C

0067 18. Meter Movements

0068 18a. Theory of operation B

A 80	A2-36 Do you trace schematic or block diagrams of circuits containing meter movements	78	63	72	59	73	71	58	27	47	53	40	47	35	28
A 82	A2-38 Do you perform maintenance on meter movement mechanical parts	41	33	45	29	43	35	30	14	16	16	15	17	10	3

0069 18b. Isolate faulty meter movements 2b

A 81	A2-37 Do you troubleshoot circuits to isolate a faulty meter movement	74	61	69	57	71	69	57	25	44	50	34	46	34	28
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0070 19. Solid State Diodes

0071 19a. Theory of operation B

A 83	A3-1 Do you trace schematic or block diagrams of circuits containing diodes	93	81	80	86	93	86	69	78	69	75	65	84	70	79
------	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----

0072 19b. Isolate faulty solid state diodes 2b

A 84	A3-2 Do you troubleshoot circuits to isolate a faulty diode	91	81	78	83	92	84	59	72	59	56	50	79	58	62
A 85	A3-3 Do you check diodes using an ohmmeter	92	80	78	83	88	83	56	73	58	54	49	81	59	63

0073 19c. Specifications B

A 86	A3-4 Do you use diode characteristic curves	26	21	23	15	22	24	9	20	6	7	5	18	10	6
A 87	A3-5 Do you use diode substitution information	45	40	39	30	33	51	16	35	13	11	12	28	20	21

D  
 T Task  
 Y Mbr

Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
 51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0074 19d. Color code B

A 88 A3-6 Do you use diode color codes 20 18 24 15 16 20 15 13 8 10 18 14 11

0075 20. Bipolar Junction Transistors

0076 20a. Theory of operation B

A 89 A3-7 Do you trace schematic or block diagrams of circuits containing transistors 93 77 73 89 94 85 68 79 53 54 58 82 55 70

0077 20b. Isolate faulty transistors 2b

A 90 A3-8 Do you troubleshoot circuits to isolate a faulty transistor 90 76 73 84 92 84 53 73 39 33 36 78 44 46  
 A 91 A3-9 Do you check transistors using an ohmmeter 87 73 68 80 84 79 50 71 33 26 30 75 39 47  
 A 92 A3-10 Do you check transistors using transistor testers 63 60 54 56 65 57 25 44 8 7 8 42 22 22

0078 20c. Specifications B

A 93 A3-11 Do you use transistor characteristic curves 22 20 15 14 17 24 8 19 5 4 3 15 6 7  
 A 94 A3-12 Do you use transistor substitution information 51 47 44 38 37 56 16 41 9 7 9 33 18 21

0079 21. Integrated Circuits

0080 21a. Familiarization B

A 95 A3-13 Do you trace schematic or block diagrams of circuits containing integrated circuits (IC) 91 61 63 65 85 77 55 75 36 41 34 60 48 57

D  
 T Task  
 Y Mbr  
 Task Title  
 303 303 303 304 304 304 305 455 455 455 455 455 455 455  
 51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0081 21b. Isolate faulty integrated circuits 2b

A 96 A3-14 Do you troubleshoot circuits to isolate a faulty IC 84 59 59 57 68 71 41 66 27 20 22 45 28 30

0082 21c. Specifications B

A 97 A3-15 Do you use IC substitution information 45 37 43 32 27 43 18 42 12 8 7 20 10 20

0083 22. Solid State Special Purpose Devices  
 (SCR, Zener Diode, Tunnel Diode, LED,  
 LCD, UJT, JFET, MOSFET)

0084 22a. Theory of operation B

A 98 A3-16 Do you trace schematic or block diagrams of circuits  
 containing solid-state special purpose devices 76 58 56 58 58 69 52 53 17 20 21 51 32 36  
 A 100 A3-18 Do you perform tasks on varactors/varicaps 63 25 27 41 39 57 38 22 2 4 3 33 22 21  
 A 101 A3-19 Do you perform tasks on tunnel diodes 36 27 15 49 38 39 29 10 2 4 2 19 8 6  
 A 102 A3-20 Do you perform tasks on field effect transistors (FET)  
 A 103 A3-21 Do you perform tasks on unijunction transistors (UJT) 77 50 50 40 58 65 46 41 8 6 32 22 25  
 A 104 A3-22 Do you perform tasks on zener diodes 45 36 28 33 50 10 25 3 3 32 22 22  
 A 105 A3-23 Do you perform tasks on liquid crystal displays (LCD) 82 65 62 62 72 71 47 57 21 23 16 54 34 31  
 A 106 A3-24 Do you perform tasks on pin diodes 47 39 33 30 35 52 28 29 9 12 9 27 16 20  
 A 107 A3-25 Do you perform tasks on light emitting diodes (LED) 69 39 27 23 28 39 34 13 3 4 2 11 11 5  
 A 108 A3-26 Do you perform tasks on fantail transistors 75 61 46 57 65 67 56 59 17 25 16 44 33 25  
 A 109 A3-27 Do you perform tasks on silicon controlled rectifiers 12 7 10 10 12 22 7 8 2 1 1 6 6 1  
 (SCR) 79 59 59 51 58 54 45 48 7 7 5 27 18 14  
 A 110 A3-28 Do you perform tasks on triacs 18 9 11 12 18 15 8 13 2 3 3 8 7 3  
 A 111 A3-29 Do you perform tasks on programmable unijunction  
 transistors (PUT) 8 5 8 8 7 9 4 5 1 1 1 4 3 2  
 A 112 A3-30 Do you perform tasks on silicon controlled  
 switches (SCS) 18 15 13 12 14 15 11 9 4 5 3 10 5 2  
 A 113 A3-31 Do you perform tasks on silicon unilateral  
 switches (SUS) 9 6 8 8 4 8 6 4 2 2 2 3 2 1  
 A 114 A3-32 Do you perform tasks on step recovery diodes (SRD) 8 6 6 6 5 7 7 3 1 1 3 5 3 1  
 A 115 A3-33 Do you perform tasks on field effect diodes (FED) 29 21 22 11 20 23 16 16 4 7 5 18 14 9  
 A 116 A3-34 Do you perform tasks on DIAC (Bi-directional  
 trigger diode) 8 5 7 8 4 7 4 4 2 3 1 4 5 2  
 A 117 A3-35 Do you perform tasks on varistors 49 27 30 33 36 40 24 28 5 11 5 29 20 24  
 A 118 A3-36 Do you perform tasks on metal oxide varistors (MOV) 10 7 10 10 4 11 4 5 1 1 2 5 5 1



D  
T Task  
Y Mbr  
Task Title  
A 119 A3-37 Do you perform tasks on schottky diodes  
303 303 303 304 304 304 305 455 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C  
22 11 15 11 16 9 7 12 2 5 3 8 9 3

0005 22b. Isolate faulty special purpose devices 2b

A 99 A3-17 Do you troubleshoot circuits to isolate a faulty solid-state special purpose device  
72 55 53 54 52 66 43 50 14 14 16 45 24 23

0006 23. Electron Tubes

0007 23a. Theory of operation B

A 120 A4-1 Do you trace block diagrams of circuits containing electron tubes  
76 82 66 49 75 67 46 15 21 29 14 63 37 45  
A 121 A4-2 Do you trace schematic diagrams of electron tube circuits  
73 79 65 45 74 67 39 13 19 26 12 62 34 40  
A 125 A4-6 Do you perform tasks on diode tubes  
49 59 51 15 65 45 6 5 12 14 5 44 26 25  
A 126 A4-7 Do you perform tasks on triode tubes  
46 65 55 15 65 48 3 4 12 16 7 46 28 28  
A 127 A4-8 Do you perform tasks on tetrode tubes  
37 47 42 13 56 47 3 2 8 11 5 35 24 21  
A 128 A4-9 Do you perform tasks on pentode tubes  
37 57 48 14 58 49 3 2 8 11 3 44 27 28  
A 129 A4-10 Do you perform tasks on beam power tubes  
22 42 19 25 53 9 32 3 2 3 2 9 8 8  
A 130 A4-11 Do you perform tasks on gas tubes  
50 65 47 13 61 21 8 2 6 9 3 32 20 16  
A 131 A4-12 Do you perform tasks on phantastrons  
10 30 38 4 6 4 2 0 6 2 1 22 14 9  
A 132 A4-13 Do you perform tasks on neon tubes  
18 21 16 8 25 11 3 2 2 2 1 12 9 9  
A 133 A4-14 Do you perform tasks on neon tubes  
5 6 6 3 8 4 3 4 1 1 1 6 3 2  
A 134 A4-15 Do you perform tasks on nixie tubes  
9 10 23 11 56 18 5 5 2 2 1 7 8 5

0008 23b. Isolate faulty tubes

A 122 A4-3 Do you troubleshoot circuits to isolate a faulty electron tube  
72 82 63 49 73 67 39 14 21 25 12 61 34 38

0009 23c. Specifications

A 123 A4-4 Do you use electron tube characteristic curves  
21 26 18 10 18 16 20 2 4 4 1 13 9 7  
A 124 A4-5 Do you use electron tube substitution manuals or charts  
44 48 48 14 44 39 8 4 10 12 5 28 18 15

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 51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0090 24. Cathode Ray Tubes (CRT)

0091 24a. Theory of operation B

A 135 A4-16 Do you trace block diagrams of circuits containing  
 cathode ray tubes (CRT) 90 83 68 25 17 22 14 53 13 4 9 44 29 32  
 A 136 A4-17 Do you trace schematic diagrams of CRT circuits 87 80 69 24 15 20 12 49 11 4 6 42 26 26  
 A 138 A4-19 Do you adjust or calibrate circuits that control  
 CRT operations 87 81 68 23 20 22 14 55 10 4 3 42 24 24  
 A 139 A4-20 Do you perform tasks on electrostatic CRT 41 34 42 10 7 14 4 22 4 2 3 24 16 14  
 A 140 A4-21 Do you perform tasks on electromagnetic CRT 73 60 47 16 9 11 8 29 8 4 4 30 20 17

0092 24b. Isolate faulty CRTs 2b

A 137 A4-18 Do you troubleshoot to isolate a faulty CRT 88 79 65 24 15 20 12 54 14 4 5 43 26 23

0093 25. Solder/Desolder

0094 25a. Terminal connections 2b

A 141 A5-1 Do you solder or desolder hardware connections 93 85 87 90 94 92 83 90 95 95 87 96 93 98  
 A 142 A5-2 Do you solder or desolder component connections  
 such as resistors, capacitors, diodes, transformers, etc 94 85 86 88 93 87 63 79 66 61 54 87 64 59

0095 25b. P C Boards 2b

A 143 A5-3 Do you solder or desolder printed circuit board  
 connections 84 76 69 81 79 78 52 72 35 27 29 68 37 40  
 A 144 A5-4 Do you solder or desolder multi-layer circuit  
 board connections 42 32 29 35 29 49 23 30 20 12 10 35 16 15  
 A 145 A5-5 Do you perform high reliability soldering 70 65 68 62 69 65 45 61 57 48 52 61 43 57

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303 303 303 304 304 304 305 455 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0096 25c. Multipin connectors 2b

A 149 A5-9 Do you repair or fabricate connectors or cables on  
multiconductor cables 77 75 72 60 60 90 57 56 58 59 58 79 72 80  
A 152 A5-12 Do you repair or fabricate connectors or cables on  
ribbon cables 31 21 20 20 12 37 17 54 9 5 6 15 11 11

0097 25d. Coaxial connectors

A 150 A5-10 Do you repair or fabricate connectors or cables on  
coaxial cables 93 86 85 88 93 92 85 48 75 65 73 96 92 99  
A 151 A5-11 Do you repair or fabricate connectors or cables on  
triaxial cables 36 53 18 28 25 24 40 17 21 10 13 27 16 28

0098 26. Assemble Solderless Connectors

0099 26a. Crimp 2b

A 146 A5-6 Do you use crimping tool to repair or make connections 90 82 78 85 89 91 79 79 98 96 89 96 96 99  
A 147 A5-7 Do you use wire wrap tool to make connections 67 45 37 63 40 52 49 59 32 26 24 30 24 32  
A 148 A5-8 Do you use punch-on tool to make connections 32 31 22 52 30 53 19 28 20 12 19 16 11 23

0100 26b. Coaxial 2b

A 150 A5-10 Do you repair or fabricate connectors or cables on  
coaxial cables 93 86 85 88 93 92 85 48 75 65 73 96 92 99  
A 151 A5-11 Do you repair or fabricate connectors or cables on  
triaxial cables 36 53 18 28 25 24 40 17 21 10 13 27 16 28

0101 26c. Multipin 2b

A 149 A5-9 Do you repair or fabricate connectors or cables on  
multiconductor cables 77 75 72 60 60 90 57 56 58 59 58 79 72 80  
A 152 A5-12 Do you repair or fabricate connectors or cables on  
ribbon cables 31 21 20 20 12 37 17 54 9 5 6 15 11 11

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## Task Title

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51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

## 0102 27. Use Test Equipment Usage

## 0103 27a. Multimeter, analog 2b

B 153 B1-1 Do you use the multimeter to measure DC voltage values 95 88 89 97 98 93 86 97 97 98 98 98 99

B 154 B1-2 Do you use the multimeter to measure AC voltage values 95 87 89 95 97 92 87 94 99 99 98 98 95 99

B 155 B1-3 Do you use the multimeter to extend the range of voltmeters using external shunts 36 30 49 33 46 29 34 24 24 18 20 32 26 25

B 156 B1-4 Do you use the multimeter to measure DC current values 86 73 78 75 69 61 71 68 60 62 57 72 58 57

B 157 B1-5 Do you use the multimeter to measure AC current values 76 70 73 70 67 56 72 60 60 60 56 70 57 56

B 158 B1-6 Do you use the multimeter to extend the range of ammeters using external shunts 24 22 34 19 25 19 24 16 16 13 15 21 16 16

B 159 B1-7 Do you use the multimeter to measure circuit resistance 80 76 85 82 84 77 74 70 90 88 88 85 82 79

B 160 B1-8 Do you use the multimeter to measure component resistance 90 85 87 89 93 85 70 82 90 83 79 92 72 70

## 0104 27b. Oscilloscope

B 161 B2-1 Do you use the oscilloscope to measure time to determine frequency 89 79 87 66 87 66 67 83 33 37 31 73 50 53

B 162 B2-2 Do you use the oscilloscope to measure time (rise, fall, pulse width, etc) 94 88 87 63 94 57 65 86 33 38 27 72 51 52

B 163 B2-3 Do you use the oscilloscope to measure AC voltage 88 81 85 74 89 76 68 80 41 43 35 74 55 55

B 164 B2-4 Do you use the oscilloscope to measure TC voltage 94 85 87 77 94 79 71 88 40 39 35 73 56 54

B 165 B2-5 Do you use the oscilloscope to measure ripple voltages 82 74 73 67 88 60 52 72 19 14 17 54 40 34

B 166 B2-6 Do you use the oscilloscope to measure phase jitter 59 51 52 33 68 20 31 35 13 12 13 34 18 18

B 167 B2-7 Do you use the oscilloscope to observe signal/data patterns 83 75 69 69 73 57 67 80 27 19 64 47 49

B 168 B2-8 Do you use the oscilloscope to observe lissajous patterns 60 21 34 18 29 20 16 29 10 13 15 30 19 17

B 169 B2-9 Do you use the oscilloscope to observe phase relationships 84 72 75 50 75 52 62 67 36 40 33 63 36 38

B 170 B2-10 Do you use attenuator probes with oscilloscopes 88 81 81 57 82 78 65 56 25 26 24 73 47 57

B 171 B2-11 Do you use delay time multipliers with oscilloscopes 70 51 38 22 65 20 27 32 14 16 11 39 19 30

## 0105 27c. Signal Generator

2b

B 172 B3-1 Do you use signal generators (SG) to perform operational checks 90 73 74 75 82 84 66 43 25 11 22 77 60 54

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Nbr		51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C
B 173	B3-2 Do you use SG to perform alignments, adjustments, or calibrations	90	73	76	74	81	81	65	44	21	9	14	78	48	52
B 174	B3-3 Do you use SG to troubleshoot circuits	82	60	65	69	67	79	61	40	16	9	16	71	47	48
0106	27d. Frequency counter	----- 2b													
B 185	B4-1 Do you use frequency counters	90	74	71	89	94	87	75	72	40	30	34	79	53	54
0107	27e. Spectrum Analyzer	----- 2b													
B 186	B4-2 Do you use spectrum analyzers	92	72	62	78	89	61	81	12	11	5	6	60	42	31
0108	27f. Field strength tester	-----													
B 187	B4-3 Do you use field strength testers	45	12	15	8	43	11	7	3	6	3	3	10	7	13
0109	27g. Multimeter, digital	----- 2b													
B 188	B4-4 Do you use digital multimeters	94	83	89	95	94	91	84	94	93	91	87	94	89	92
0110	27h. Digital logic probe	----- 2b													
B 189	B4-5 Do you use digital logic probes	44	28	34	20	22	21	17	36	11	2	7	12	9	10
0111	27i. Capacitor tester	----- 2b													
B 190	B4-6 Do you use capacitance testers	52	35	44	26	33	34	10	16	35	26	23	24	14	17
0112	27j. Capacitor substitution box	-----													
B 191	B4-7 Do you use capacitor substitution boxes	6	8	20	9	5	10	6	4	9	11	8	8	9	7



### Task

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1	Task 1
2	Task 2
3	Task 3
4	Task 4
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6	Task 6
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9	Task 9
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11	Task 11
12	Task 12
13	Task 13
14	Task 14
15	Task 15
16	Task 16
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18	Task 18
19	Task 19
20	Task 20
21	Task 21
22	Task 22
23	Task 23
24	Task 24
25	Task 25
26	Task 26
27	Task 27
28	Task 28
29	Task 29
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31	Task 31
32	Task 32
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37	Task 37
38	Task 38
39	Task 39
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41	Task 41
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74	Task 74
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79	Task 79
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81	Task 81
82	Task 82
83	Task 83
84	Task 84
85	Task 85
86	Task 86
87	Task 87
88	Task 88
89	Task 89
90	Task 90
91	Task 91
92	Task 92
93	Task 93
94	Task 94
95	Task 95
96	Task 96
97	Task 97
98	Task 98
99	Task 99
100	Task 100

303 303 303 304 304 304 305 455 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0113 27k. DC restorer

**B 192 B4-8 Do you use DC restorers (CRT rejuvenators)**

5 6 8 8 5 4 5 3 2 1 3 3 5 3

0114 271. Logic current tracer

**B 193 B4-9 Do you use logic current tracers**

**12 12 12 7 7 7 9 3 4 3 3 5 3**

0115 27m. Tube tester

**B 194 B4-10 Do you use tube testers**

53 60 53 20 72 44 5 4 16 21 8 46 24 18

0116 27n. Logic pulser

**B 195 B4-11 Do you use logic pulsers**

9 12 10 9 7 7 7 9 2 3 3 1 4 3

0117 270. Logic analyzer

2b

**B 196 B4-12 Do you use logic analyzers**

11 16 21 9 7 8 10 24 2 2 3 3 5 2

0118 27p. Signature analyzer

**B 197 B4-13 Do you use signature analyzers**

3 3 7 9 5 6 4 6 3 3 2 3 2 3

0119 27q. Reflectometer

2b

**B 198 B4-14 Do you use reflectometers**

11 13 7 13 7 22 8 4 37 20 23 65 60 56

0120	28. Transistor Amplifier Circuits (Common Emitter, Common Collector, Common Base)
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51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

## 0121 28a. Theory of operation

## 0122 28a(1). Amplifier circuits B

C 199	C1-1 Do you trace block diagrams of circuits containing transistor amplifiers	86	69	60	75	82	81	54	51	30	33	34	73	47	63
C 200	C1-2 Do you trace schematic diagrams of transistor amplifier circuits	85	69	59	70	81	79	47	49	25	27	27	69	40	49
C 204	C1-6 Do you adjust or align transistor amplifiers	66	48	41	56	56	64	32	27	6	7	7	50	21	29
C 206	C1-8 Do you calculate values of transistor amplifier voltage, current or power gain	33	29	26	28	30	32	19	14	3	4	3	23	10	14
C 207	C1-9 Do you work on compound-connected (Darlington Pair) transistor amplifiers	60	14	18	24	58	38	6	17	4	4	5	15	14	16
C 208	C1-10 Do you work on cascade-connected transistor amplifiers	67	33	17	20	50	46	9	13	2	5	3	37	23	21
C 209	C1-11 Do you work on paraphase transistor amplifiers	13	15	15	9	8	26	5	3	1	2	5	21	14	10
C 210	C1-12 Do you work on push-pull transistor amplifiers	69	55	45	46	60	70	19	29	12	10	15	60	31	34
C 211	C1-13 Do you work on audio transistor amplifiers	34	15	30	62	57	78	22	13	6	5	8	64	39	45
C 212	C1-14 Do you work on wideband transistor amplifiers	32	25	19	50	15	39	25	5	2	4	4	31	19	18
C 213	C1-15 Do you work on IF transistor amplifiers	82	59	51	61	62	77	47	6	6	3	6	68	39	46
C 214	C1-16 Do you work on RF transistor amplifiers	77	51	38	60	76	76	53	10	4	5	6	64	39	47
C 215	C1-17 Do you work on buffer transistor amplifiers	68	58	44	51	69	66	34	22	15	12	13	40	27	21
C 216	C1-18 Do you work on complementary symmetry transistor amplifiers	36	14	13	15	13	34	7	7	2	6	3	22	15	17
C 217	C1-19 Do you work on DC transistor amplifiers (switching applications)	63	45	48	41	47	48	19	35	15	14	15	39	26	23

## 0123 28a(2). Stabilization circuits B

C 218	C2-1 Do you trace schematic diagrams of amplifier stabilization circuits	51	42	24	30	38	54	15	22	11	12	12	37	26	30
C 220	C2-3 Do you perform tasks on emitter (swamping) resistor stabilization amplifiers	53	37	20	29	29	53	16	23	8	8	6	45	24	26
C 221	C2-4 Do you perform tasks on self-bias stabilization amplifiers	35	22	18	24	25	46	13	12	6	8	7	30	17	17
C 222	C2-5 Do you perform tasks on thermistor stabilization amplifiers	51	29	19	22	35	45	16	17	10	7	8	41	23	24
C 223	C2-6 Do you perform tasks on diode stabilization amplifiers	53	39	26	27	38	47	17	24	10	10	8	42	24	28
C 224	C2-7 Do you perform tasks on double diode stabilization amplifiers	25	17	12	13	19	22	8	9	2	4	4	17	12	10

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0124 28a(3). Coupling circuits B

C 225 C3-1 Do you trace block diagrams of circuits containing coupling circuits 69 63 53 46 63 72 32 34 21 21 22 55 41 44  
 C 226 C3-2 Do you trace schematic diagrams of coupling circuits 68 62 54 42 64 71 26 33 18 18 18 54 36 39  
 C 229 C3-5 Do you perform tasks on direct coupling circuits 64 52 45 40 58 68 25 29 15 14 13 51 35 32  
 C 230 C3-6 Do you perform tasks on capacitive-resistive coupling circuits 55 50 42 33 50 59 17 24 11 13 11 45 28 29  
 C 231 C3-7 Do you perform tasks on capacitive-inductive coupling circuits 51 50 36 33 53 59 17 17 8 8 9 44 26 28  
 C 232 C3-8 Do you perform tasks on transformer coupling circuits 65 60 47 39 53 65 17 23 12 11 12 50 31 30  
 C 233 C3-9 Do you perform tasks on optical coupling circuits 17 9 10 10 8 14 6 10 0 0 2 4 5 2

0125 28b. Isolate faulty amplifier circuits 2b

C 201 C1-3 Do you troubleshoot to isolate a faulty transistor amplifier 81 66 57 69 77 78 42 47 19 18 17 68 36 40  
 C 205 C1-7 Do you measure transistor amplifier voltage, current, or power gain 60 53 41 59 51 61 37 31 12 9 9 49 26 30  
 C 227 C3-3 Do you troubleshoot circuits to isolate a faulty coupling circuit 64 58 49 40 58 68 23 30 11 15 11 50 33 29

0126 28c. Troubleshoot circuits 2b

C 202 C1-4 Do you troubleshoot transistor amplifiers to circuit level components 71 64 52 61 70 74 25 42 10 9 11 56 27 32  
 C 203 C1-5 Do you troubleshoot transistor amplifier distortion 47 36 28 35 44 55 17 21 5 4 5 37 18 22  
 C 219 C2-2 Do you troubleshoot amplifier stabilization circuits to circuit level components 47 41 21 25 36 51 12 19 5 8 5 33 21 22  
 C 228 C3-4 Do you troubleshoot coupling circuits to circuit level components 57 56 43 35 50 64 16 26 6 10 8 41 27 24

0127 29. Electron Tube Amplifiers



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51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0128 29a. Theory of operation

C 234	C4-1 Do you trace block diagrams of circuits containing electron tube amplifiers	55	76	47	36	69	60	44	6	13	22	6	51	28	31
C 235	C4-2 Do you trace schematic diagrams of electron tube amplifiers	54	75	47	33	70	59	40	6	9	18	5	51	26	28
C 239	C4-6 Do you adjust or align electron tube amplifiers	46	62	40	26	59	50	31	4	4	8	1	35	23	18
C 241	C4-8 Do you calculate values of electron tube amplifier voltage, current, or power gain	22	40	24	12	30	24	21	3	0	3	1	18	8	8
C 242	C4-9 Do you perform tasks on paraphase electron tube amplifiers	9	17	19	3	6	20	3	0	0	1	1	18	12	11
C 243	C4-10 Do you perform tasks on push-pull electron tube amplifiers	29	46	30	10	46	42	5	2	4	4	1	36	21	20
C 244	C4-11 Do you perform tasks on audio electron tube amplifiers	9	10	15	13	40	43	4	1	2	2	2	39	23	20
C 245	C4-12 Do you perform tasks on voltage regulator electron tube amplifiers	38	58	41	13	58	37	16	4	5	8	3	39	23	21
C 246	C4-13 Do you perform tasks on common grid electron tube amplifiers	37	53	35	12	49	37	13	2	6	9	2	34	20	21
C 247	C4-14 Do you perform tasks on common cathode electron tube amplifiers	40	57	36	14	50	39	15	3	6	9	2	33	19	18
C 248	C4-15 Do you perform tasks on cathode follower electron tube amplifiers	40	60	40	12	63	38	7	2	4	7	2	38	22	20

0129 29b. Isolate faulty tube amplifiers

C 236	C4-3 Do you troubleshoot to isolate a faulty electron tube amplifier	53	71	46	34	67	59	38	5	10	17	5	49	25	22
C 240	C4-7 Do you measure electron tube amplifier voltage, current, or power gain	39	67	38	30	54	45	38	4	7	7	2	39	22	18

0130 29c. Troubleshoot circuits

C 237	C4-4 Do you troubleshoot electron tube amplifiers to circuit level components	46	65	43	21	61	54	23	4	5	8	3	42	22	21
C 238	C4-5 Do you troubleshoot electron tube amplifier distortion	33	45	30	14	50	40	19	3	3	2	1	28	15	13

0131 30. Operational Amplifiers

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 51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0132 30a. Theory of operation		B	
C 249	C5-1 Do you trace block or schematic diagrams of circuits containing operational amplifiers (op amps)	83	62 55 45 71 61 40 50 22 20 28 35 29 21
C 251	C5-3 Do you calculate op amp gain	24	24 36 18 23 22 17 15 4 3 4 8 5 6
C 252	C5-4 Do you adjust op amp bias, offsets, or drift	58	44 39 30 43 38 23 25 7 7 9 17 12 7
C 253	C5-5 Do you use or apply operational amplifiers for general purpose (inverting or non-inverting)	73	57 52 33 63 52 21 41 9 12 13 23 18 15
C 254	C5-6 Do you use or apply operational amplifiers as differential/comparators	66	45 47 28 56 41 19 30 9 9 8 20 13 9
C 255	C5-7 Do you use or apply operational amplifiers for summing	66	45 46 15 40 28 16 21 10 13 15 11 8 6
C 256	C5-8 Do you use or apply operational amplifiers for unity gain amplifier (buffer)	49	41 40 25 51 37 16 18 10 6 10 13 10 7
C 257	C5-9 Do you use or apply operational amplifiers as active filters	31	17 19 21 37 23 17 14 5 7 7 10 9 5
C 258	C5-10 Do you use or apply operational amplifiers as oscillators	58	37 38 28 54 37 23 26 8 8 6 27 17 17
C 259	C5-11 Do you use or apply operational amplifiers as integrators	49	31 39 12 39 22 14 16 8 8 11 15 9 8
C 260	C5-12 Do you use or apply operational amplifiers for differentiators	56	35 44 19 44 29 13 23 6 6 6 16 9 8
C 261	C5-13 Do you use or apply operational amplifiers for power supplies (voltage regulators)	71	58 51 38 60 45 32 42 20 16 19 31 18 18
C 262	C5-14 Do you use or apply operational amplifiers as analog/digital (A/D) digital/analog (D/A) converters	73	50 44 24 47 33 26 36 10 11 11 26 18 16
C 263	C5-15 Do you use or apply operational amplifiers as multivibrators	65	48 40 23 57 35 15 29 9 11 8 31 16 15
C 264	C5-16 Do you use or apply operational amplifiers as modulators/demodulators	60	35 38 26 46 40 31 24 10 10 9 25 16 16

0133	30b. Isolate faulty Op Amps	-																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		</
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0134 31. Magnetic Amplifiers

D  
T Task  
Y Nbr

Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

## 0135 31a. Theory of operation

C 265 C6-1 Do you trace block diagrams of circuits containing magnetic amplifiers

C 266 C6-2 Do you trace schematic diagrams of magnetic amplifier circuits

C 269 C6-5 Do you adjust magnetic amplifiers or components

15 9 20 4 15 3 7 5 6 11 6 5 4 8

15 8 20 4 14 3 6 5 5 7 6 5 4 7

13 5 18 3 11 3 5 4 2 5 3 4 3 2

## 0136 31b. Isolate faulty magnetic amplifiers

C 267 C6-3 Do you troubleshoot to isolate a faulty magnetic amplifier

15 6 20 4 11 3 5 5 4 8 4 5 3 3

## 0137 31c. Troubleshoot circuits

C 268 C6-4 Do you troubleshoot magnetic amplifiers to circuit level components

12 5 17 3 9 3 4 4 2 2 3 3 2 2

## 0138 32. Saturable Reactors

## 0139 32a. Theory of operation

C 270 C6-6 Do you trace block diagrams of circuits containing saturable reactors

C 271 C6-7 Do you trace schematic diagrams of saturable reactor circuits

C 274 C6-10 Do you adjust saturable reactor circuits or components

32 17 22 8 36 11 5 3 3 6 2 12 7 6

30 16 22 7 35 11 4 3 2 4 3 12 7 6

23 14 15 5 26 8 4 2 0 2 1 7 4 3

## 0140 32b. Isolate faulty saturable reactors

C 272 C6-8 Do you troubleshoot to isolate a faulty saturable reactor

28 16 19 7 32 10 4 3 2 4 2 12 7 3

D  
T Task  
Y Nbr  
Task Title  
303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0141 32c. Troubleshoot circuits

C 273 C6-9 Do you troubleshoot saturable reactors to circuit level components 25 14 16 7 25 9 4 2 1 1 2 8 5 3

0142 33. Power Supply Circuits (Half-wave, Full-wave, Full-wave bridge)

0143 33a. Theory of operation

0144 33a(1). Rectifiers (Half-wave, Full-wave, Full-wave bridge)

D 275 D1-1 Do you trace block diagrams of circuits containing power supplies 93 84 84 85 91 85 79 83 62 66 70 77 58 76  
D 276 D1-2 Do you trace schematic diagrams of power supply circuits 90 83 84 80 92 83 67 78 51 54 59 74 49 66  
D 279 D1-5 Do you align or adjust power supplies 90 82 83 79 88 80 67 80 22 20 25 68 39 52  
D 280 D1-6 Do you perform tasks on half-wave rectifier power supplies 73 71 66 50 68 62 33 46 18 16 15 56 31 34  
D 281 D1-7 Do you perform tasks on full-wave rectifier power supplies 79 77 74 56 74 70 38 52 21 19 17 62 32 37  
D 282 D1-8 Do you perform tasks on full-wave bridge rectifier power supplies 76 76 74 57 73 73 42 52 24 18 18 64 34 38  
D 283 D1-9 Do you perform tasks on three-phase rectifier power supplies 67 61 43 32 36 27 31 28 15 14 11 30 16 17

0145 33a(2). Filters (Capacitive, Inductive, L-Section, Pi-Section)

D 288 D2-1 Do you trace block diagrams of circuits containing power supply filters 69 73 59 46 63 70 35 49 19 18 30 54 32 44  
D 289 D2-2 Do you trace schematic diagrams of power supply filters 66 72 60 43 62 68 30 46 17 14 23 52 28 37  
D 292 D2-5 Do you perform tasks on capacitive power supply filters 61 68 51 38 55 64 25 40 14 9 16 48 26 32  
D 293 D2-6 Do you perform tasks on inductive power supply filters 55 60 46 31 41 58 19 21 9 9 9 43 22 26  
D 294 D2-7 Do you perform tasks on L-type power supply filters 34 42 31 23 25 52 12 12 4 4 8 39 22 24

D	Tsk	Task Title	303	303	303	304	304	304	304	305	455	455	455	455	455
Y	Nbr		51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B
D 295		D2-8 Do you perform tasks on Pi-type power supply filters	31	45	32	26	29	54	14	11	2	4	5	35	20
D 296		D2-9 Do you perform tasks on T-type power supply filters	31	26	27	23	22	40	13	9	2	4	5	27	18
D 297		D2-10 Do you perform tasks on resistive capacitive (RC) power supply filters	58	61	50	28	53	58	20	30	14	10	13	49	24
D 298		D2-11 Do you perform tasks on inductive capacitive (LC) power supply filters	56	59	45	30	49	58	19	22	9	10	10	44	22

0146 33b. Isolate faulty power supplies 2b

D 277		D1-3 Do you troubleshoot circuits to isolate a faulty power supply	90	82	85	82	91	83	77	83	52	56	60	77	53
D 290		D2-3 Do you troubleshoot circuits to isolate a faulty power supply filter	65	70	55	42	60	66	24	46	14	9	17	50	26

0147 33c. Troubleshoot circuits 2b

D 278		D1-4 Do you troubleshoot power supplies to circuit level components	76	78	79	68	84	77	46	62	19	22	21	60	33
D 291		D2-4 Do you troubleshoot power supply filters to circuit level components	59	63	48	40	53	62	18	37	7	5	8	42	24

0148 34. Voltage Regulators (Shunt, Series EVR, IC EVR)

0149 34a. Theory of operation B

D 299		D3-1 Do you trace block diagrams of circuits containing power supply voltage regulators	86	80	78	71	82	79	54	62	26	27	33	62	39
D 300		D3-2 Do you trace schematic diagrams of power supply voltage regulator circuits	82	79	80	67	82	77	45	60	22	21	24	60	34
D 303		D3-5 Do you perform tasks on variable resistor power supply voltage regulators	77	71	63	50	67	67	35	45	14	16	18	51	30
D 304		D3-6 Do you perform tasks on zener diode power supply voltage regulators	67	57	53	46	64	63	35	41	9	10	9	47	26
D 305		D3-7 Do you perform tasks on transistor series power supply voltage regulators	65	58	40	48	59	62	23	37	6	8	7	40	25
D 306		D3-8 Do you perform tasks on IC power supply voltage regulators	45	27	35	30	33	43	17	26	5	5	5	21	16
D 307		D3-9 Do you perform tasks on pulse width modulator power supply voltage regulators	48	26	27	11	19	14	10	13	2	3	5	18	15

D T Y	Task Title	303	303	304	304	304	304	305	455	455	455	455	455
Nbr		51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A
										X2B	X2C		
D 308	D3-10 Do you perform tasks on transistor series power supply voltage regulators with current limiting	55	43	32	29	41	43	17	24	4	5	3	24
D 309	D3-11 Do you perform tasks on crow bar power supply voltage regulators	59	20	18	13	23	25	26	21	2	4	1	3
-----													
0150	34b. Isolate faulty voltage regulators 2b												
D 301	D3-3 Do you troubleshoot circuits to isolate a faulty power supply voltage regulator	81	77	77	64	78	75	46	60	21	15	19	60
0151	34c. Troubleshoot circuits 2b												
D 302	D3-4 Do you troubleshoot power supply voltage regulators to circuit level components	72	73	70	55	72	70	27	50	8	7	8	47
0152	35. Resistive/Capacitive/Inductive (RCL) Ci cuits												
-----													
0153	35a. Basic operation B												
E 310	E1-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	69	56	48	46	68	60	31	29	20	22	16	49
0154	35b. Resonant operation B												
E 312	E1-3 Do you trace schematic or block diagrams of circuits containing resonant RCL circuits	64	49	39	37	63	54	25	22	14	14	10	41
0155	35c. Troubleshoot circuits 2b												
E 311	E1-2 Do you troubleshoot RCL circuits to circuit level components	59	50	42	40	57	54	18	24	11	9	9	44
E 313	E1-4 Do you troubleshoot resonant RCL circuits to circuit level components	54	44	34	31	53	50	14	18	8	7	7	35

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T Tsk  
Y Nbr

Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0156 35d. Calculations

B

E 314 E1-5 Do you calculate values of impedance, voltage, or  
current in RCL circuits 23 26 22 13 22 22 11 9 5 5 5 13 8 11  
E 315 E1-6 Do you calculate phase angle of RCL circuits 14 14 15 8 15 13 7 6 3 4 2 8 4 5  
E 316 E1-7 Do you calculate values of power in RCL circuits 17 17 16 10 18 16 8 7 3 3 4 8 4 9

0157 36. Frequency Sensitive Filters (Low Pass,  
High Pass, Band Pass, Band Reject)

0158 36a. Theory of operation

B

E 317 E2-1 Do you trace schematic or block diagrams of circuits  
containing frequency sensitive filters 64 52 41 50 59 64 45 16 9 12 8 46 32 36  
E 320 E2-4 Do you align or adjust frequency sensitive filters 54 45 33 35 51 49 24 10 5 1 2 31 15 18  
E 322 E2-6 Do you perform tasks on low pass  
frequency sensitive filters 57 46 35 48 58 59 34 16 10 8 5 41 27 21  
E 323 E2-7 Do you perform tasks on high pass  
frequency sensitive filters 56 42 33 47 59 55 33 15 9 8 5 40 24 21  
E 324 E2-8 Do you perform tasks on band pass  
frequency sensitive filters 68 51 44 55 66 63 46 13 10 6 3 48 32 30  
E 325 E2-9 Do you perform tasks on band-reject  
frequency sensitive filters 45 29 25 45 44 42 32 7 4 2 3 30 16 14  
E 326 E2-10 Do you perform tasks on ferrite bead  
frequency sensitive filters 19 9 10 11 25 29 8 3 2 1 1 7 6 6

0159 36b. Isolate faulty frequency sensitive  
filters 2b

E 318 E2-2 Do you troubleshoot circuits to isolate a faulty  
frequency sensitive filter 59 48 38 45 54 60 39 15 7 5 6 42 30 25

0160 36c. Troubleshoot circuits 2b

E 319 E2-3 Do you troubleshoot frequency sensitive filters to  
circuit level components 44 42 33 35 44 49 18 11 3 2 3 36 17 18

D  
 T Task 303 303 303 304 304 304 305 455 455 455 455 455 455  
 Y Nbr 51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0161 36d. Calculations

E 321 E2-5 Do you calculate capacitance or inductance values for 19 19 18 13 17 23 8 5 2 1 1 8 5 5  
 specific frequency sensitive filters

0162 37. Wave Generating Circuits

0163 37a. Theory of operation

0164 37a(1). Oscillators (LC, RC, Crystal) B

F 327 Fl-1 Do you trace block diagrams of circuits containing oscillators 86 74 69 66 84 71 56 51 12 11 10 60 38 53  
 F 328 Fl-2 Do you trace schematic diagrams of oscillator circuits 83 75 69 60 84 69 45 47 11 8 7 56 34 43  
 F 331 Fl-5 Do you align or adjust oscillator circuits 81 67 61 60 80 64 48 39 5 4 5 49 30 34  
 F 332 Fl-6 Do the oscillators you work with use LC tank circuits 65 52 47 33 65 57 21 22 8 7 5 51 30 29  
 F 333 Fl-7 Do the oscillators you work with use RC networks 59 54 51 35 66 54 16 27 8 7 5 52 30 28  
 F 334 Fl-8 Do the oscillators you work with use crystals 85 73 64 62 82 62 45 42 9 5 3 57 39 36  
 F 335 Fl-9 Do the oscillators you work with use phase lock loops (PLL) 47 20 20 45 35 60 50 21 1 1 2 18 7 15  
 F 336 Fl-10 Do you perform tasks on series Hartley oscillator circuits 51 45 23 18 55 42 10 17 3 3 3 36 19 20  
 F 337 Fl-11 Do you perform tasks on shunt Hartley oscillator circuits 46 33 16 18 23 37 8 15 4 2 3 33 16 17  
 F 338 Fl-12 Do you perform tasks on Colpitts oscillator circuits 33 24 10 19 60 39 7 12 2 1 1 30 21 22  
 F 339 Fl-13 Do you perform tasks on Clapp oscillator circuits 22 6 6 12 10 14 5 3 0 1 1 7 5 2  
 F 340 Fl-14 Do you perform tasks on voltage control oscillators (VCO/VTD) 61 27 27 50 29 51 44 19 1 1 2 39 22 22  
 F 341 Fl-15 Do you perform tasks on crystal oscillator circuits 78 66 50 57 75 55 41 36 8 4 3 49 26 32  
 F 342 Fl-16 Do you perform tasks on Wien bridge oscillator circuits 21 8 7 9 15 25 5 3 0 1 1 11 9 10  
 F 343 Fl-17 Do you perform tasks on pulse generating oscillator circuits 41 29 30 18 29 21 15 17 1 4 4 30 18 11  
 F 344 Fl-18 Do you perform tasks on blocked/blocking oscillator circuits 35 39 35 10 19 12 5 6 1 2 1 18 14 10  
 F 345 Fl-19 Do you perform tasks on burst generators 12 4 6 7 39 9 6 3 0 1 1 9 8 8  
 F 346 Fl-20 Do you perform tasks on RC phase shift oscillators 31 20 17 13 40 23 13 8 1 1 2 23 11 11



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T Task  
Y Nbr

Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0165 37a(2). Multivibrators (Astable, Bistable, B Monostable)

F 347	F2-1 Do you trace block diagrams of circuits containing multivibrators	79	70	68	40	79	44	25	44	13	16	12	47	28	31
F 348	F2-2 Do you trace schematic diagrams of multivibrator circuits	77	69	67	38	77	43	20	42	10	11	9	44	24	28
F 351	F2-3 Do you adjust or align multivibrator circuits	68	51	57	29	65	33	13	28	6	1	4	34	18	18
F 352	F2-6 Do the multivibrators you work with use LC tank circuits	60	45	41	27	59	37	13	18	5	9	6	38	22	23
F 353	F2-7 Do the multivibrators you work with use RC networks	60	53	52	29	65	39	12	29	7	10	6	41	24	24
F 354	F2-8 Do the multivibrators you work with use Crystals	70	58	44	33	62	30	17	30	7	4	4	40	23	23
F 355	F2-9 Do you perform tasks on astable (free running) multivibrators	66	53	56	30	56	38	12	34	8	8	5	37	22	26
F 356	F2-10 Do you perform tasks on monostable (one shot) multivibrators	71	63	55	29	68	38	14	39	6	10	5	37	22	21
F 357	F2-11 Do you perform tasks on bistable (flip flop) multivibrators	74	60	54	35	67	40	19	41	10	11	6	41	24	24
F 358	F2-12 Do you perform tasks on triggered astable multivibrators	60	42	44	24	43	30	9	27	5	5	3	29	16	20

0166 37a(3). Waveshaping Circuits (Schmitt Trigger, Sawtooth, RC Integ/Diff) B

F 359	F3-1 Do you trace block diagrams of circuits containing waveshaping circuits (WSC)	75	70	60	32	70	37	22	34	8	12	6	39	28	36
F 360	F3-2 Do you trace schematic diagrams of WSC	73	69	60	28	70	35	17	31	7	9	5	36	24	29
F 363	F3-5 Do you adjust or calibrate WSC	66	58	49	21	59	28	15	27	3	4	3	30	18	20
F 364	F3-6 Do you perform tasks on sawtooth wave generator WSC	74	63	53	20	39	27	18	19	4	7	3	33	19	23
F 365	F3-7 Do you perform tasks on trapezoidal (ramp) wave generator WSC	62	40	41	10	28	16	9	11	0	1	2	27	14	23
F 366	F3-8 Do you perform tasks on RC differentiating WSC	51	42	36	14	49	20	9	14	0	4	3	17	16	9
F 367	F3-9 Do you perform tasks on RL differentiating WSC	37	26	23	10	32	17	7	10	0	3	3	14	11	10
F 368	F3-10 Do you perform tasks on RC integrating WSC	43	29	31	12	31	17	8	14	0	5	2	13	11	7
F 369	F3-11 Do you perform tasks on RL integrating WSC	33	21	20	9	25	16	7	9	0	4	2	13	9	8
F 370	F3-12 Do you perform tasks on square wave generator WSC	62	53	48	27	54	29	19	27	4	10	3	31	21	23
F 371	F3-13 Do you perform tasks on rectangular wave generator WSC	40	30	35	11	33	16	8	15	2	3	2	19	13	16
F 372	F3-14 Do you perform tasks on Schmitt trigger WSC	63	49	41	28	65	30	17	27	4	7	3	23	16	16

D      Task Title      303 303 304 304 304 304 305 455 455 455 455 455 455 455  
 Y Nbr      51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0167      37b. Isolate faulty wave generating circuits      2b

F 329      F1-3 Do you troubleshoot to isolate a faulty oscillator circuit      81 73 68 59 78 68 48 46 11 4 6 53 32 30  
 F 349      F2-3 Do you troubleshoot to isolate a faulty multivibrator circuit      71 66 63 33 71 41 18 40 9 7 6 43 22 20  
 F 361      F3-3 Do you troubleshoot to isolate a faulty WSC      69 67 56 25 64 33 16 29 6 7 7 34 19 22

0168      37c. Troubleshoot circuits      2b

F 330      F1-4 Do you troubleshoot oscillators to circuit level components      64 65 61 47 71 60 19 36 7 2 2 39 25 24  
 F 350      F2-4 Do you troubleshoot multivibrators to circuit level components      60 59 58 28 60 35 11 33 7 4 2 31 18 13  
 F 362      F3-4 Do you troubleshoot WSC to circuit level components      55 63 51 23 55 28 9 24 3 5 3 26 17 15

0169      38. Limiter Circuits (Diode, Zener Diode, Transistor)

0170      38a. Theory of operation      B

F 373      F4-1 Do you trace block diagrams of circuits containing limiters      76 63 53 37 58 53 24 34 7 17 6 40 25 32  
 F 374      F4-2 Do you trace schematic diagrams of limiter circuits      74 63 51 35 58 52 19 30 4 13 3 37 22 23  
 F 381      F4-9 Do you perform tasks on series diode limiter circuits      56 41 31 23 40 44 16 24 3 5 2 29 18 14  
 F 382      F4-10 Do you perform tasks on shunt diode limiter circuits      53 50 30 21 33 43 13 23 3 5 2 29 17 15  
 F 383      F4-11 Do you perform tasks on bias limiter circuits      46 37 23 20 26 31 11 16 1 4 1 18 12 11  
 F 384      F4-12 Do you perform tasks on zener diode circuits      66 49 43 30 49 44 18 28 3 10 2 34 20 17  
 F 385      F4-13 Do you perform tasks on transistor limiter circuits      53 44 25 23 35 39 11 19 2 5 2 26 16 13  
 F 386      F4-14 Do you perform tasks on triode limiter circuits      21 24 18 7 19 17 7 6 0 2 1 15 11 5

0171      38b. Isolate faulty limiters      2b

F 377      F4-5 Do you troubleshoot to isolate a faulty limiter circuit      65 58 47 33 51 48 17 27 3 8 3 31 18 16

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303 303 303 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0172 38c. Troubleshoot circuits 2b

F 378 F4-6 Do you troubleshoot limiters to circuit level components

56 57 42 28 45 41 12 24 2 5 1 24 18 14

0173 39. Clamper Circuits

0174 39a. Theory of operation B

F 375 F4-3 Do you trace block diagrams of circuits containing clampers

65 60 48 29 56 43 17 29 2 10 3 32 19 16

F 376 F4-4 Do you trace schematic diagrams of clamper circuits

64 59 47 27 54 42 16 28 2 9 2 28 18 15

F 387 F4-15 Do you perform tasks on diode clamper circuits

55 49 34 21 43 36 14 24 1 5 2 22 12 10

F 388 F4-16 Do you perform tasks on bias clamper circuits

44 42 22 13 29 23 9 15 1 3 2 15 7 6

0175 39b. Isolate faulty clampers 2b

F 379 F4-7 Do you troubleshoot to isolate a faulty clamper circuit

59 58 44 25 47 40 14 26 1 6 1 25 15 13

0176 39c. Troubleshoot circuits 2b

F 380 F4-8 Do you troubleshoot clampers to circuit level components

52 55 42 23 43 35 11 23 1 4 1 19 14 10

0177 40. Digital Numbering Systems (Binary, Octal, Hexadecimal)

0178 40a. Conversions B

G 389 G1-1 Do you convert decimal numbers to binary numbers or binary numbers to decimal

71 38 34 24 35 25 27 57 20 18 17 31 21 18

G 390 G1-2 Do you convert octal numbers to binary or binary numbers to octal

55 29 34 18 20 12 17 49 20 15 13 17 15 7

D	Tsk	Task Title	303	303	303	304	304	304	304	305	455	455	455	455	455
Y	Mbr		51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B
G 391		G1-3 Do you convert hexadecimal numbers to binary or binary numbers to hexadecimal	62	19	25	16	20	10	20	52	16	13	10	15	9
G 392		G1-4 Do you convert octal numbers to decimal or decimal numbers to octal	52	28	33	18	17	10	17	46	19	15	16	15	5
G 393		G1-5 Do you convert hexadecimal numbers to decimal or decimal numbers to hexadecimal	63	19	23	15	22	10	17	50	16	12	9	12	9
G 394		G1-6 Do you convert octal numbers to hexadecimal or hexadecimal numbers to octal	44	19	22	13	16	8	14	38	15	12	10	10	8
G 395		G1-7 Do you convert base number fractions to another base numbering system	35	19	20	10	16	9	14	22	8	12	8	10	11

0179 40b. Math operations B

G 396		G1-8 Do you add binary numbers	56	36	28	19	26	20	21	43	15	15	10	22	16
G 397		G1-9 Do you subtract binary numbers	54	36	27	18	26	20	17	39	13	14	10	20	14
G 398		G1-10 Do you multiply binary numbers	31	28	19	13	19	14	13	23	9	12	6	13	9
G 399		G1-11 Do you divide binary numbers	28	27	18	13	16	14	12	22	9	12	6	13	9
G 400		G1-12 Do you add octal numbers	36	27	24	14	15	7	10	36	13	12	7	10	7
G 401		G1-13 Do you subtract octal numbers	36	26	24	14	14	7	9	33	12	11	8	10	6
G 402		G1-14 Do you add hexadecimal numbers	42	17	15	13	18	9	12	34	10	11	5	8	5
G 403		G1-15 Do you subtract hexadecimal numbers	40	17	15	13	17	9	11	32	9	10	5	9	5

0180 40c. Binary Code Systems B

G 404		G1-16 Do you use binary coded decimal (BCD)	66	45	30	21	31	28	26	34	14	14	10	27	20
G 405		G1-17 Do you use gray codes	51	43	17	7	9	5	9	19	3	4	2	5	3
G 406		G1-18 Do you use ICAO codes	33	4	5	2	4	1	2	3	0	1	1	3	1
G 407		G1-19 Do you use excess-3 (XS3) codes	9	7	5	4	3	2	4	6	4	4	2	3	0
G 408		G1-20 Do you use parity bit codes	54	17	15	18	9	16	12	31	7	7	5	10	7
G 409		G1-21 Do you use binary codes	6	4	5	4	2	1	5	4	0	2	2	2	3
G 410		G1-22 Do you use ASCII codes	26	6	19	6	8	15	28	56	2	4	3	4	7
G 411		G1-23 Do you use EBCDI codes	4	4	4	2	3	2	3	7	0	1	1	2	1

0181 41. Digital Logic Functions (Main Logic Gates and Flip-Flops)

0182 41a. Theory of operation B

G 412		G1-24 Do you trace data flow through logic symbol diagrams	76	50	45	36	56	36	31	72	20	21	12	38	25
G 413		G1-25 Do you trace data flow through logic schematic diagrams	74	51	44	35	51	35	30	72	21	19	13	34	22



D T Y	Task Title	303	303	303	304	304	304	304	305	455	455	455	455	455	455
		51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C
G 440	G1-52 Do you perform tasks on TTL (transistor transistor logic)	46	45	37	19	37	20	18	54	4	5	4	12	10	1
G 441	G1-53 Do you perform tasks on ECL/CHL (emitter coupled or current mode logic)	16	22	13	6	9	4	5	15	1	4	3	3	3	1
G 442	G1-54 Do you perform tasks on HTL (high threshold logic)	12	6	7	5	5	3	4	7	2	3	2	1	1	0
G 443	G1-55 Do you perform tasks on CHOS (complementary metal oxide semiconductor)	26	16	31	18	25	12	8	30	2	3	2	5	5	1
G 444	G1-56 Do you perform tasks on positive MOS ICs	18	12	13	7	9	6	3	14	1	3	2	4	4	0
G 445	G1-57 Do you perform tasks on negative MOS ICs	15	12	12	7	8	5	3	12	1	3	2	3	3	0
G 446	G1-58 Do you perform tasks on vertical MOS ICs	10	6	8	3	6	3	2	6	1	2	2	2	1	0

#### 0186 42. Boolean Equations

#### 0187 42a. Diagram to equation B

G 435 G1-47 Do you develop Boolean equations from logic circuits or diagrams 20 12 11 8 9 10 9 19 6 5 5 8 6 2

#### 0188 42b. Equation to diagram B

G 436 G1-48 Do you develop logic diagrams from Boolean equations 17 12 9 8 8 9 8 16 6 5 4 8 5 2

#### 0189 42c. Simplify Expressions -

G 437 G1-49 Do you simplify Boolean expressions using Boolean algebra 20 13 11 9 11 10 8 18 6 5 4 7 5 2

#### 0190 43. Computers

#### 0191 43a. Operation principles B

G 447 G2-1 Do you trace block or schematic diagrams of computer controlled or computer based systems 67 12 30 8 13 16 21 71 25 23 27 11 13 6

G 454 G2-8 Do you perform tasks on analog computers 20 8 20 1 9 9 5 26 27 19 26 12 8 3

G 455 G2-9 Do you perform tasks on digital computers 71 17 39 10 19 15 29 82 33 27 26 19 15 9

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303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0192 43b. Load programs 2b

G 448 G2-2 Do you load programs 69 13 34 6 12 15 30 74 21 17 20 10 9 6

0193 43c. Write/debug programs 2b

G 449 G2-3 Do you write or debug programs 15 4 10 3 4 4 5 26 3 2 2 3 0  
G 453 G2-7 Do you use computer flow charts or diagrams 63 6 25 5 12 11 19 73 20 13 17 9 8 0

0194 43d. Fault isolation 2b

G 450 G2-4 Do you troubleshoot computers to a major unit 68 9 27 7 14 12 23 77 26 19 24 11 11 3  
G 451 G2-5 Do you troubleshoot computers to a subassembly or circuit card 67 10 27 6 15 10 22 78 26 14 21 12 8 1

0195 43e. Circuit troubleshooting 2b

G 452 G2-6 Do you troubleshoot computer subassembly or circuit card to circuit level components or IC 32 8 15 4 8 5 7 53 11 5 6 6 1 1

0196 43f. Types of memories B

G 466 G2-20 Do you perform tasks on magnetic (tape, disc, core) computer memories 59 10 33 3 13 15 22 81 24 15 17 10 7 7  
G 467 G2-21 Do you perform tasks on semiconductor (RAM, ROM, EPROM, PROM) computer memories 58 10 22 9 13 12 16 65 13 14 13 9 8 1  
G 468 G2-22 Do you perform tasks on paper (tape, punch card) computer memories 41 5 6 1 5 6 6 35 10 5 5 4 2 0  
G 469 G2-23 Do you perform tasks on advanced technology (bubble, CCD, electron beam, laser, thin film) computer memories 4 4 3 0 2 2 2 6 5 2 2 2 1 0

0197 43g. Peripheral devices B

G 470 G2-24 Do you perform tasks on computer keyboards 50 13 38 8 23 21 34 82 15 11 20 9 11 3  
G 471 G2-25 Do you perform tasks on computer character printers 22 8 19 8 16 12 24 63 8 3 5 6 7 1  
G 472 G2-26 Do you perform tasks on magnetic tape drives 26 7 20 1 3 10 15 69 8 4 6 4 3 2

D	Tsk	Task Title	303	303	304	304	304	304	305	455	455	455	455	455	455
Y	Nbr		51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B
G 473		Do you perform tasks on microprocessor computer terminals	18	6	13	2	8	11	11	52	4	3	7	3	3
G 474		Do you perform tasks on video display unit (VDU/monitors)	27	8	23	5	13	11	18	74	10	6	13	4	3
G 475		Do you perform tasks on paper tape readers/punches	38	4	4	2	5	5	8	25	7	3	5	3	3
G 476		Do you perform tasks on paper card readers/punches	7	4	3	0	2	2	2	28	1	2	2	2	0
G 477		Do you perform tasks on toggle or push button switch inputs	58	9	21	5	5	9	13	60	11	10	12	7	3
G 478		Do you perform tasks on incandescent displays (Nixie tubes, LEDs, LCDs)	40	12	15	7	8	13	15	49	6	7	12	8	0
G 479		Do you perform tasks on modems	31	6	5	5	15	14	22	47	2	1	2	3	7
G 480		Do you perform tasks on line printers	20	9	27	4	13	11	13	75	4	4	3	4	7
G 481		Do you perform tasks on floppy disc drives	8	6	28	5	8	13	13	51	2	3	5	3	2
G 482		Do you perform tasks on removable cartridge disc drives	6	5	8	0	3	5	5	30	2	1	3	2	1
G 483		Do you perform tasks on removable pack disc drives	7	4	6	0	1	3	3	35	1	1	1	2	0
G 484		Do you perform tasks on fixed Winchester type disc drives	4	6	3	1	4	8	7	24	1	1	2	2	0

0198 43h. Programming languages

G 456	G2-10	Do you use Basic computer language	23	6	15	7	9	10	10	23	5	7	8	4	2
G 457	G2-11	Do you use COBOL computer language	5	3	2	0	2	2	3	3	1	1	3	2	1
G 458	G2-12	Do you use FORTRAN computer language	5	3	10	0	2	1	3	7	1	1	2	2	1
G 459	G2-13	Do you use ADA computer language	3	3	2	0	2	1	2	1	1	1	1	1	0
G 460	G2-14	Do you use ATLAS computer language	2	3	2	0	2	1	2	1	2	1	2	1	1
G 461	G2-15	Do you use ELAN computer language	2	3	2	0	2	1	2	1	1	1	1	1	0
G 462	G2-16	Do you use PASCAL computer language	4	3	2	0	2	1	3	3	2	1	1	2	0
G 463	G2-17	Do you use RPG computer language	3	3	2	0	2	1	2	2	1	1	1	1	0
G 464	G2-18	Do you use Machine computer language	27	5	5	0	7	2	8	36	4	4	4	2	3
G 465	G2-19	Do you use C computer language	3	3	2	0	2	1	2	2	1	1	1	2	1

0199 44. Microprocessor Controlled Systems

0200 44a. Theory of operation B

G 485	G2-39	Do you trace block or schematic diagrams of microprocessor controlled systems	38	7	18	8	11	17	16	52	7	9	9	6	9
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303 303 303 304 304 304 305 455 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0201 44b. Isolate faulty microprocessors 2b

G 486 G2-40 Do you troubleshoot microprocessor controlled systems to a subassembly or circuit card 38 7 16 7 11 15 14 52 7 8 7 6 5 1  
G 487 G2-41 Do you troubleshoot microprocessor controlled systems to isolate a faulty microprocessor 27 6 11 5 9 11 9 40 3 7 2 4 2 1

0202 45. Logic Circuits

0203 45a. Theory of operation

0204 45a(1). Counters (Synchronous/ Asynchronous-Up/Down counters) B

G 488 G3-1 Do you trace data flow through circuits containing counters 63 45 38 26 49 28 18 49 12 8 6 26 18 16  
G 491 G3-4 Do you perform tasks on UP counters in logic circuits 57 47 32 22 46 25 13 44 6 5 5 23 15 15  
G 492 G3-5 Do you perform tasks on DOWN counters in logic circuits 54 45 28 19 39 24 12 40 5 5 5 18 13 14  
G 493 G3-6 Do you perform tasks on DECADE counters in logic circuits 38 35 22 15 44 14 8 15 4 4 3 8 3 6  
G 494 G3-7 Do you perform tasks on ring counters in logic circuits 34 15 10 7 19 10 5 26 1 4 2 3 3 3  
G 495 G3-8 Do you perform tasks on modulus counters in logic circuits 10 10 9 5 11 4 3 19 0 2 2 2 2 0  
G 496 G3-9 Do you perform tasks on synchronous (parallel) counters in logic circuits 45 32 23 14 26 14 10 31 2 5 3 7 9 5  
G 497 G3-10 Do you perform tasks on asynchronous (serial) counters in logic circuits 42 32 23 17 29 16 11 32 3 5 2 9 8 6

0205 45a(2). Registers (Shift and Storage) B

G 498 G3-11 Do you trace logic diagrams of circuits containing registers 59 41 27 23 23 20 14 53 6 7 7 11 9 9  
G 501 G3-14 Do you perform tasks on shift registers in logic circuits 63 40 28 21 21 20 13 47 4 7 5 11 6 6

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 303 303 303 304 304 304 305 455 455 455 455 455 455 455  
 51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0209 46. D/A, A/D Converters (Approx D/A and Ramp A/D)

0210 46a. Theory of operation B

G 516 G4-1 Do you trace data flow through A/D converters 73 47 37 20 36 23 33 33 8 14 12 20 15 13  
 G 517 G4-2 Do you trace data flow through D/A converters 73 45 34 18 32 24 33 37 8 14 11 25 18 21  
 G 520 G4-5 Do the converters you perform tasks on use flash conversion 5 4 3 2 2 1 5 3 1 0 1 1 1 0  
 G 521 G4-6 Do the converters you perform tasks on use successive approximation conversion 16 12 9 4 6 5 8 6 2 4 1 3 4 3  
 G 522 G4-7 Do the converters you perform tasks on use ramp conversion 33 25 10 3 18 5 7 12 1 2 1 2 7 6  
 G 523 G4-8 Do the converters you perform tasks on use R2R conversion 12 5 3 2 4 1 4 2 0 1 1 2 1 0

0211 46b. Isolate faulty converters 2b

G 518 G4-3 Do you troubleshoot A/D converter circuits 72 41 30 17 34 21 31 30 8 10 9 15 10 8  
 G 519 G4-4 Do you troubleshoot D/A converter circuits 71 40 28 16 30 22 29 33 8 9 9 21 12 16

0212 47. Transmission Lines

0213 47a. Theory of operation B

H 527 H1-4 Do you construct transmission lines 27 33 19 23 49 46 17 6 2 1 2 48 35 48  
 H 528 H1-5 Do you match transmission line impedance with loads 38 24 19 22 58 49 17 6 0 1 1 27 18 29  
 H 531 H1-8 Do you perform tasks on open-wire transmission lines 22 12 10 15 20 26 9 6 4 4 3 18 18 18  
 H 532 H1-9 Do you perform tasks on twisted pair transmission lines 41 14 17 30 23 29 19 17 2 4 3 16 28 22  
 H 533 H1-10 Do you perform tasks on twin lead transmission lines 24 11 10 20 23 28 15 5 1 4 2 11 10 13  
 H 534 H1-11 Do you perform tasks on flexible coaxial transmission lines 72 55 49 45 72 69 48 15 10 7 7 67 62 69  
 H 535 H1-12 Do you perform tasks on rigid coaxial transmission lines 63 43 40 30 57 35 32 5 2 2 1 42 24 31  
 H 536 H1-13 Do you perform tasks on fiber-optic transmission lines 5 7 2 6 5 14 8 8 0 1 1 2 1 1

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 Task Title  
 303 303 303 304 304 304 304 305 455 455 455 455 455 455 455  
 51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0214 47b. Perform Measurements 2b

H 524 H1-1 Do you measure electrical length on transmission lines 36 12 11 10 72 36 9 4 2 2 2 32 22 28  
 H 525 H1-2 Do you measure physical length on transmission lines 40 27 19 19 63 44 17 7 3 2 2 45 30 45  
 H 526 H1-3 Do you measure standing wave ratio (SWR) on trans- mission lines 64 53 31 25 77 60 31 2 1 2 1 57 60 63

0215 47c. Calculations

H 529 H1-6 Do you calculate the characteristic impedance (ZO) of transmission lines 15 10 9 11 30 24 7 2 0 1 0 10 7 13

0216 47d. Isolate faulty transmission lines

H 530 H1-7 Do you troubleshoot transmission lines 60 37 31 30 69 59 28 16 2 3 4 58 54 61

0217 48. Waveguides

0218 48a. Theory of operation B

H 537 H1-14 Do you trace schematic or block diagrams of circuits containing waveguides 88 67 74 48 8 5 59 2 8 5 5 41 35 33  
 H 539 H1-16 Do you pressurize or purge waveguide assemblies 67 68 64 27 4 3 47 1 2 2 3 37 30 24  
 H 540 H1-17 Do you measure standing wave ratio for waveguide assemblies 83 68 47 27 5 3 34 1 1 1 2 30 25 16  
 H 541 H1-18 Do you remove or install waveguide or associated coupling hardware components 86 69 73 43 5 5 56 1 4 4 4 44 34 30

0219 48b. Isolate faulty waveguides 2b

H 538 H1-15 Do you troubleshoot circuits to isolate a faulty waveguide assembly 83 63 70 45 6 5 56 1 7 4 4 44 30 30

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Y Nbr

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303 303 303 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0220 49. Microwave Oscillators & Amplifiers

0221 49a. Theory of operation B

H 542	H2-1 Do you trace schematic or block diagrams of circuits containing microwave oscillators or amplifiers	65	50	58	55	14	2	42	1	2	2	4	32	20	22
H 545	H2-4 Do you perform tasks on two-cavity klystron microwave oscillators and amplifiers	8	6	8	10	1	0	13	0	0	1	2	9	9	9
H 546	H2-5 Do you perform tasks on three-cavity klystron microwave oscillators and amplifiers	4	34	6	20	33	0	17	0	0	1	1	3	1	7
H 547	H2-6 Do you perform tasks on reflex klystron microwave oscillators and amplifiers	22	13	30	15	2	0	4	0	3	2	2	17	7	9
H 548	H2-7 Do you perform tasks on traveling wave tube microwave oscillators and amplifiers	41	30	27	36	0	0	41	1	0	0	1	3	2	1
H 549	H2-8 Do you perform tasks on magnetron microwave oscillators and amplifiers	76	30	65	4	4	0	5	0	1	1	4	33	21	16
H 550	H2-9 Do you perform tasks on backward wave oscillator	3	9	13	4	0	0	3	0	0	0	0	0	0	2
H 551	H2-10 Do you perform tasks on parametric amplifiers	58	9	12	12	0	0	42	0	0	0	1	0	1	1
H 552	H2-11 Do you perform tasks on yttrium iron garnet (YIG) tuned microwave oscillators and amplifiers	2	27	19	3	2	1	7	0	0	0	0	1	0	2

0222 49b. Tune or Adjust 2b

H 544	H2-3 Do you tune or adjust microwave oscillators or amplifiers	60	47	55	54	14	1	42	1	2	1	3	30	14	15
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0223 49c. Isolate faulty microwave oscillators 2b or amplifiers

H 543	H2-2 Do you troubleshoot circuits to isolate a faulty microwave oscillator or amplifier	62	47	55	53	13	2	41	1	2	1	4	31	16	16
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0224 50. Resonant Cavities

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Task Title

303 303 303 304 304 304 305 455 455 455 455 455 455  
 51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0225 50a. Theory of operation B

H 553 H3-1 Do you trace schematic or block diagrams of  
 circuits containing resonant cavities 62 53 46 27 53 29 25 1 1 0 2 34 23 26  
 H 558 H3-6 Do you perform tasks on probe resonant cavities 27 40 22 13 27 8 12 0 0 1 26 15 17  
 H 559 H3-7 Do you perform tasks on loop resonant cavities 22 37 14 9 20 8 7 0 1 0 1 16 8 5  
 H 560 H3-8 Do you perform tasks on aperture (iris/window)  
 resonant cavities 18 32 10 4 8 6 10 0 0 0 11 9 5

0226 50b. Isolate faulty resonant cavities 2b

H 554 H3-2 Do you troubleshoot circuits to isolate a  
 faulty resonant cavity 53 51 44 23 46 28 17 1 1 0 1 32 22 20  
 H 557 H3-5 Do you measure frequency of resonant cavities 53 44 46 17 41 22 14 1 1 0 1 27 18 20

0227 50c. Tune/adjust 2b

H 555 H3-3 Do you tune or adjust resonant cavities electrically 47 42 41 19 44 25 17 1 1 0 1 25 16 20  
 H 556 H3-4 Do you tune or adjust resonant cavities physically 58 52 45 29 54 27 25 1 1 0 1 29 18 17

0228 51. Transmitters

0229 51a. Theory of operation

0230 51a(1). Amplitude Modulation

H 561 H4-1 Do you use "AM" modulation principles 41 14 18 11 59 59 14 2 0 1 2 47 48 49  
 H 562 H4-2 Do you trace block diagrams of AM transmitters 35 14 18 10 67 66 14 2 1 1 1 44 45 53  
 H 563 H4-3 Do you trace block diagrams of AM transmitter  
 subassemblies or circuit cards 33 13 16 9 65 65 13 2 1 1 0 40 31 40  
 H 564 H4-4 Do you trace schematic diagrams of AM transmitter  
 subassemblies or circuit cards 32 13 16 9 67 63 11 2 1 1 0 36 29 29  
 H 568 H4-8 Do you align or adjust AM transmitters or circuits 35 12 14 9 65 64 10 2 1 0 0 38 27 34  
 H 569 H4-9 Do you calculate percentage of modulation for  
 AM transmitters 24 9 10 6 66 59 8 1 0 0 0 34 26 32

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303 303 303 304 304 304 304 305 455 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0231 51a(2). Frequency Modulation

H 593 H4-33 Do you use "FM" modulation principles  
H 594 H4-34 Do you trace block diagrams of FM transmitters  
H 595 H4-35 Do you trace block diagrams of FM transmitter subassemblies or circuit cards  
H 596 H4-36 Do you trace schematic diagrams of FM transmitter subassemblies or circuit cards  
H 600 H4-40 Do you align or adjust FM transmitters or circuits  
H 601 H4-41 Do you calculate modulation index for FM transmitters  
H 602 H4-42 Do you measure frequency deviation for FM transmitters

0232 51a(3). Single Side Band

H 578 H4-18 Do you trace block diagrams of single side band (SSB) transmitters  
H 579 H4-19 Do you trace block diagrams of SSB transmitter subassemblies or circuit cards  
H 580 H4-20 Do you trace schematic diagrams of SSB transmitter subassemblies or circuit cards  
H 584 H4-24 Do you align or adjust SSB transmitters or circuits  
H 585 H4-25 Do you calculate percentage of modulation for SSB transmitters

0233 51a(4). Pulse Modulation

H 612 H4-52 Do you use "PM" modulation principles  
H 613 H4-53 Do you trace block diagrams of PM transmitters  
H 614 H4-54 Do you trace block diagrams of PM transmitter subassemblies or circuit cards  
H 615 H4-55 Do you trace schematic diagrams of PM transmitter subassemblies or circuit cards  
H 619 H4-59 Do you align or adjust PM transmitters or circuits  
H 620 H4-60 Do you calculate pulse recurrence time (PRT) or pulse recurrence frequency (PRF) for PM transmitters  
H 621 H4-61 Do you measure PRT, PRF or pulse width for PM transmitters

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303 303 303 304 304 304 304 305 455 455 455 455 455 455  
 51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

Task Title

0234 51b. Isolate faulty transmitters

H 565 H4-5 Do you troubleshoot AM transmitters to major units 27 12 16 8 65 65 12 2 1 1 1 45 44 51  
 H 566 H4-6 Do you troubleshoot AM transmitters to subassemblies or circuit cards 30 12 13 8 65 64 12 2 1 0 0 37 28 31  
 H 581 H4-21 Do you troubleshoot SSB transmitters to major units 3 5 2 18 9 60 6 0 0 0 2 33 34 21  
 H 582 H4-22 Do you troubleshoot SSB transmitters to subassemblies or circuit cards 3 5 2 18 8 59 6 0 0 0 1 28 19 13  
 H 597 H4-37 Do you troubleshoot FM transmitters to major units 36 22 17 55 53 38 38 3 2 1 2 56 39 47  
 H 598 H4-38 Do you troubleshoot FM transmitters to subassemblies or circuit cards 35 20 16 55 54 35 36 3 2 1 1 48 28 31  
 H 616 H4-56 Do you troubleshoot PM transmitters to major units 59 46 46 5 37 1 15 2 1 1 2 33 22 23  
 H 617 H4-57 Do you troubleshoot PM transmitters to subassemblies or circuit cards 59 45 45 4 36 2 13 2 1 1 1 27 17 15

0235 51c. Troubleshoot circuits

H 567 H4-7 Do you troubleshoot AM transmitter subassemblies or circuit cards to circuit level components 19 12 13 6 58 59 7 2 1 0 0 28 17 15  
 H 583 H4-23 Do you troubleshoot SSB transmitter subassemblies or circuit cards to circuit level components 2 5 1 16 6 52 5 0 0 0 1 22 11 9  
 H 599 H4-39 Do you troubleshoot FM transmitter subassemblies or circuit cards to circuit level components 26 19 15 42 46 28 17 2 0 1 1 37 18 21  
 H 618 H4-58 Do you troubleshoot PM transmitter subassemblies or circuit cards to circuit level components 51 45 43 3 32 1 8 2 1 1 1 23 13 13

0236 52. Receivers

0237 52a. Theory of operation

0238 52a(1). Amplitude Modulation

H 570 H4-10 Do you use "AM" demodulation principles 34 8 12 9 33 64 11 3 0 1 2 45 34 43  
 H 571 H4-11 Do you trace block diagrams of AM receivers 31 12 14 8 36 73 12 3 1 1 1 58 45 52  
 H 572 H4-12 Do you trace block diagrams of AM receiver subassemblies or circuit cards 31 12 14 8 35 72 12 3 0 1 1 54 32 44



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Task Title  
H 573 H4-13 Do you trace schematic diagrams of AM receiver  
subassemblies or circuit cards  
H 577 H4-17 Do you align or adjust AM receivers or circuits

303 303 303 304 304 304 304 305 455 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C  
28 12 12 8 35 71 11 3 0 1 1 51 31 32  
30 11 11 8 34 70 10 2 1 0 1 53 28 40

0239 52a(2). Frequency Modulation

H 603 H4-43 Do you use "FM" demodulation principles  
H 604 H4-44 Do you trace block diagrams of FM receivers  
H 605 H4-45 Do you trace block diagrams of FM receiver  
subassemblies or circuit cards  
H 606 H4-46 Do you trace schematic diagrams of FM receiver  
subassemblies or circuit cards  
H 610 H4-50 Do you align or adjust FM receivers or circuits  
H 611 H4-51 Do you plot receiver signal level curves (RSL)  
for FM receivers

39 14 17 52 27 42 38 4 2 1 3 47 33 43  
36 20 16 58 31 47 42 4 2 1 3 54 35 51  
36 19 16 57 30 46 38 4 1 1 3 51 27 37  
35 19 15 53 29 44 33 4 1 1 3 46 26 34  
36 17 13 56 27 44 29 3 1 1 2 50 23 31  
9 6 3 51 10 20 15 1 0 0 1 11 6 8

0240 52a(3). Single Side Band

H 586 H4-26 Do you trace block diagrams of SSB receivers  
H 587 H4-27 Do you trace block diagrams of SSB receiver  
subassemblies or circuit cards  
H 588 H4-28 Do you trace schematic diagrams of SSB receiver  
subassemblies or circuit cards  
H 592 H4-32 Do you align or adjust SSB receivers or circuits

2 6 2 20 3 66 6 0 0 0 2 32 33 22  
2 6 1 20 3 64 6 0 0 0 1 30 26 18  
2 6 1 18 3 63 6 0 0 0 1 29 22 15  
3 6 2 19 4 62 6 0 0 0 1 28 16 15

0241 52a(4). Pulse Modulation

H 622 H4-62 Do you use "PM" demodulation principles  
H 623 H4-63 Do you trace block diagrams of PM receivers  
H 624 H4-64 Do you trace block diagrams of PM receiver  
subassemblies or circuit cards  
H 625 H4-65 Do you trace schematic diagrams of PM receiver  
subassemblies or circuit cards  
H 629 H4-69 Do you align or adjust PM receivers or circuits

50 35 40 4 25 4 14 2 0 1 2 23 15 22  
54 41 42 5 27 4 14 2 1 1 3 28 16 25  
53 40 40 5 27 4 13 2 0 1 3 24 12 21  
53 40 40 4 27 3 11 2 0 1 2 25 12 17  
53 41 38 3 27 3 11 2 0 1 2 26 10 15

0242 52b. Isolate faulty receivers

H 574 H4-14 Do you troubleshoot AM receivers to major units  
H 575 H4-15 Do you troubleshoot AM receivers to  
subassemblies or circuit cards  
H 589 H4-29 Do you troubleshoot SSB receivers to major units

27 11 12 7 33 72 12 2 0 1 2 60 45 51  
28 11 12 8 33 70 11 3 0 0 1 52 30 36  
3 5 2 18 3 65 6 0 0 0 2 35 36 20

D T Y	Task Title	303	303	303	304	304	304	304	305	455	455	455	455	455	455
Nbr		51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C
H 590	H4-30 Do you troubleshoot SSB receivers to sub-assemblies or circuit cards	2	4	1	18	3	62	6	0	0	0	2	30	20	15
H 607	H4-47 Do you troubleshoot FM receivers to major units	33	18	15	56	28	47	39	3	1	1	3	54	34	41
H 608	H4-48 Do you troubleshoot FM receivers to subassemblies or circuit cards	33	16	13	56	27	44	34	3	1	1	2	48	24	30
H 626	H4-66 Do you troubleshoot PM receivers to major units	51	40	39	5	28	3	13	2	0	1	3	29	15	21
H 627	H4-67 Do you troubleshoot PM receivers to subassemblies or circuit cards	52	39	38	4	27	3	13	2	0	1	2	25	11	13

0243 52c. Troubleshoot circuits

H 576	H4-16 Do you troubleshoot AM receiver subassemblies or circuit cards to circuit level components	18	10	9	6	31	65	7	2	0	0	0	44	20	18
H 591	H4-31 Do you troubleshoot SSB receiver subassemblies or circuit cards to circuit level components	2	6	1	17	2	56	5	0	0	0	1	24	12	9
H 609	H4-49 Do you troubleshoot FM receiver subassemblies or circuit cards to circuit level components	23	15	12	42	24	36	18	2	1	1	2	36	15	20
H 628	H4-68 Do you troubleshoot PM receiver subassemblies or circuit cards to circuit level components	44	40	36	2	25	3	8	1	0	1	1	19	10	9

0244 53. Transmission Power

0245 53a. Perform measurements B

I 660	I1-1 Do you measure RF power	91	73	85	67	89	73	82	2	6	2	6	79	68	86
I 661	I1-2 Do you measure RF peak power	84	70	77	31	88	46	43	2	4	1	3	59	44	59
I 662	I1-3 Do you measure RF average power	88	72	81	33	85	39	39	1	2	1	3	50	38	48
I 663	I1-4 Do you measure RF effective power	49	43	57	24	37	36	36	1	1	0	3	34	30	29
I 664	I1-5 Do you measure RF output power using wattmeters	62	56	50	47	87	74	74	1	4	1	6	73	68	89

0246 53b. Calculations B

I 665	I2-1 Do you calculate RF apparent power	29	20	25	11	25	17	17	1	0	0	3	11	11	10
I 666	I2-2 Do you calculate RF true power	30	24	26	18	36	20	18	1	0	0	3	20	18	15
I 667	I2-3 Do you calculate RF power loss or gain in db	79	58	69	44	75	42	59	2	4	1	4	47	38	38

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## Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0247

## 54. Antennas

0248

## 54a. Theory of operation

H 634 H5-5 Do you plot graph radiation patterns  
H 637 H5-8 Do you work with Vagi antennas  
H 638 H5-9 Do you work with dipole antennas  
H 639 H5-10 Do you work with slotted antennas  
H 640 H5-11 Do you work with rotary antennas  
H 641 H5-12 Do you work with hertz antennas  
H 642 H5-13 Do you work with marconi antennas  
H 643 H5-14 Do you work with rhombic antennas  
H 644 H5-15 Do you work with scimitar antennas  
H 645 H5-16 Do you work with parabolic antennas  
H 646 H5-17 Do you work with ground plane antennas  
H 647 H5-18 Do you perform tasks on rotary antenna arrays  
H 648 H5-19 Do you perform tasks on stacked (end fire) antenna arrays  
H 649 H5-20 Do you perform tasks on broadside antenna arrays  
H 650 H5-21 Do you perform tasks on cardioid antenna arrays  
H 651 H5-22 Do you perform tasks on collinear antenna arrays  
H 652 H5-23 Do you perform tasks on phase antenna arrays  
H 653 H5-24 Do you perform tasks on planar antenna arrays  
H 654 H5-25 Do you perform tasks on antennas with vertical polarization  
H 655 H5-26 Do you perform tasks on antennas with horizontal polarization  
H 656 H5-27 Do you perform tasks on antennas with circular polarization  
H 657 H5-28 Do you perform tasks on antennas with unidirectional radiation patterns  
H 658 H5-29 Do you perform tasks on antennas with bidirectional radiation patterns  
H 659 H5-30 Do you perform tasks on antennas with omnidirectional radiation patterns

0249

## 54b. Perform alignments

H 630 H5-1 Do you physically align antennas  
H 631 H5-2 Do you electrically align antennas  
H 636 H5-7 Do you measure standing wave ratio (SWR) for antennas

D	T	Tsk	Nbr
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Task Title

303	303	303	304	304	304	305	455	455	455	455	455	455	455
51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C

0250 54c. Isolate faulty antennas

H 632	H5-3	Do you troubleshoot loading of antennas
H 633	H5-4	Do you troubleshoot coupling of antennas
H 635	H5-6	Do you troubleshoot antenna components

37	27	25	13	50	43	17	0	1	1	3	41	33	40
54	38	37	16	56	46	24	1	3	2	5	52	35	48
71	53	46	20	53	35	48	1	5	4	6	59	53	34

**0251 55. Microphones**

0252 55a. Theory of operation

J 668	Jl-1 Do you trace block diagrams of circuits containing microphones
J 669	Jl-2 Do you trace schematic diagrams of microphone circuits
J 672	Jl-5 Do you work on carbon microphones
J 673	Jl-6 Do you work on capacitor microphones
J 674	Jl-7 Do you work on crystal microphones
J 675	Jl-8 Do you work on dynamic microphones
J 676	Jl-9 Do you work on velocity ribbon microphones

15	4	22	23	18	73	8	6	1	1	3	31	36	55
13	4	20	19	18	70	6	6	1	1	2	28	26	48
8	2	13	16	9	69	8	4	1	0	2	24	30	45
1	2	2	2	2	16	2	1	0	0	1	2	2	7
3	2	5	4	5	14	4	1	0	0	0	5	5	5
7	3	17	10	11	70	3	3	1	0	2	28	33	48
1	2	2	0	1	5	1	0	0	0	0	2	1	2

0253 55b. Isolate faulty microphones

**J 670 J1-3 Do you troubleshoot to isolate a faulty microphone**

14 4 21 22 18 74 9 6 1 1 3 37 39 48

0254 55c. Troubleshoot circuits

**J 671 J1-4 Do you troubleshoot microphones**

10	4	17	17	14	66	6	4	0	0	2	21	18	32
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**0255 56. Speakers**

0256 56a. Theory of operation

**J 677 J1-10 Do you trace block diagrams of circuits containing speakers**

17 6 23 36 18 76 12 11 10 1 4 42 39 43

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Y Mbr  
Task Title  
J 678 J1-11 Do you trace schematic diagrams of speaker circuits  
303 303 303 304 304 304 305 455 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C  
17 6 22 33 18 73 10 10 9 1 4 34 30 38

0257 56b. Isolate faulty speakers

J 679 J1-12 Do you troubleshoot to isolate a faulty speaker  
16 6 22 34 18 75 13 12 10 1 4 44 41 40

0258 56c. Troubleshoot circuits

J 680 J1-13 Do you troubleshoot speakers  
11 6 16 23 12 57 9 5 3 1 2 15 17 21

0259 57. Photosensitive Devices

0260 57a. Theory of operation B

J 681 J2-1 Do you trace block diagrams of circuits containing photosensitive devices  
47 19 24 9 5 23 12 34 4 1 1 8 5 3  
J 682 J2-2 Do you trace schematic diagrams of photosensitive device circuits  
44 19 22 9 5 22 12 32 4 1 1 7 5 2  
J 684 J2-4 Do you adjust or calibrate photosensitive devices  
36 14 13 7 4 16 7 27 3 0 0 4 1 0  
J 685 J2-5 Do you work on photodiodes  
15 9 10 3 2 13 4 26 2 1 0 3 1 1  
J 686 J2-6 Do you work on phototransistors  
10 6 12 2 1 10 3 17 2 1 1 3 1 0  
J 687 J2-7 Do you work on phototubes  
39 14 6 5 0 2 2 1 0 0 1 1 0 0  
J 688 J2-8 Do you work on photo-SCRs  
5 3 5 1 0 5 1 4 0 0 1 1 1 1  
J 689 J2-9 Do you work on photocells (Photoconductive or Photovoltaic)  
14 9 13 4 5 14 8 18 2 1 0 2 1 1

0261 57b. Isolate faulty photosensitive devices 2b

J 683 J2-3 Do you troubleshoot to isolate a faulty photosensitive device  
44 19 21 8 5 21 12 34 5 2 0 7 3 2

0262 58. Display Tubes

6

**Tsk**

Task Title	Y Nbr
1. Review the project charter and scope statement.	1
2. Identify the project objectives and deliverables.	2
3. Develop a project management plan.	3
4. Create a work breakdown structure (WBS).	4
5. Develop a project schedule.	5
6. Identify project risks and develop a risk management plan.	6
7. Develop a communication management plan.	7
8. Develop a stakeholder engagement plan.	8
9. Develop a resource management plan.	9
10. Develop a procurement management plan.	10
11. Develop a quality management plan.	11
12. Develop a project closure plan.	12

**303 303 303 304 304 304 305 455 455 455 455 455**

0263 50a. Theory of operation

J 690	J3-1 Do you trace block diagrams of circuits containing display tubes	9	2	6	1	4	1	5	3	0	0	5	14	5	9
J 691	J3-2 Do you trace schematic diagrams of display tubes or circuits	9	2	5	1	4	1	3	3	0	0	4	14	4	7
J 693	J3-4 Do you adjust or calibrate display tubes or circuits	8	2	6	1	4	1	3	3	0	1	2	13	4	7
J 694	J3-5 Do you work on direct view storage tubes (DVST)	3	1	6	1	1	0	2	2	0	0	3	12	3	9
J 695	J3-6 Do you work on multiple mode storage tubes (MMST)	1	1	2	0	1	0	1	0	0	0	2	1	1	1
J 696	J3-7 Do you work on scan converter tubes (SCT)	1	1	2	0	1	0	1	1	0	0	0	1	3	1

0264 58b. Isolate faulty display tubes

J 692 J3-3 Do you troubleshoot to isolate a faulty display tube

**0265 59. Support Subjects**

0266 59a. Safety applicable to electronics B

0267 59b. First aid for electrical shock B

0268 59c. Electrostatic Discharge (ESD) Control B

**0269 Tasks not referenced**

B 175	B3-4	Do you use audio sine-wave signal generators	27	20	31	64	53	75	40	23	15	4	10	63	46	38
B 176	B3-5	Do you use audio non-sinusoidal signal generators	10	13	12	19	13	29	12	9	5	0	3	25	14	8
B 177	B3-6	Do you use RF less than 1,000MH signal generators	35	43	38	53	54	70	56	10	7	5	7	58	47	37
B 178	B3-7	Do you use RF greater than 1,000MH signal generators	75	53	63	57	44	33	49	6	4	1	5	48	28	25
B 179	B3-8	Do you use white noise signal generators	9	6	9	25	6	10	10	5	1	0	3	4	5	6
B 180	B3-9	Do you use pattern signal generators	15	12	11	19	9	13	25	14	2	0	4	8	7	10

D T Y	Task Nbr	Task Title	303	303	303	304	304	304	304	305	455	455	455	455	455	455	455	455	455
			51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C			
B 181	B 181	B3-10 Do you use pseudo-random signal generators	5	6	5	8	6	5	20	3	1	0	1	0	1	3	5	5	5
B 182	B 182	B3-11 Do you use time mark signal generators	20	25	21	10	23	10	11	5	3	1	3	10	8	7			
B 183	B 183	B3-12 Do you use multi-function (square/sine/triangular) signal generators	55	47	46	26	19	24	29	31	11	5	10	37	23	18			
B 184	B 184	B3-13 Do you use TV signal signal generators	23	6	9	15	5	6	4	4	1	1	3	4	3	3			
D 284	D 284	D1-10 Do you perform tasks on voltage multipliers (doublers/triplers)	63	57	52	36	54	51	27	31	13	12	15	47	26	28			
D 285	D 285	D1-11 Do you perform tasks on DC to DC converters	52	44	43	51	63	62	29	40	19	17	20	42	27	29			
D 286	D 286	D1-12 Do you perform tasks on inverters (DC to AC converters)	49	51	49	43	37	46	28	35	25	28	26	46	22	24			
D 287	D 287	D1-13 Do you perform tasks on switching power supplies	25	13	16	19	19	42	14	15	4	4	3	10	7	6			
J 697	J 697	J4-1 Do you trace block diagrams of TV systems or subassemblies	51	1	32	17	1	4	2	3	1	1	7	1	0	1			
J 698	J 698	J4-2 Do you trace schematic diagrams of TV systems or component circuits	52	1	30	17	1	4	2	3	1	1	7	1	0	1			
J 699	J 699	J4-3 Do you troubleshoot TV systems to major subassemblies	51	1	27	16	1	4	2	3	1	1	6	1	0	1			
J 700	J 700	J4-4 Do you troubleshoot TV systems to circuit level components	49	1	22	15	1	3	2	2	0	0	3	0	0	1			
J 701	J 701	J4-5 Do you adjust or calibrate TV systems or components	50	1	26	16	1	4	2	3	0	1	3	0	0	1			
J 702	J 702	J4-6 Do you trace block diagrams of laser systems or subassemblies	1	1	3	1	0	2	1	3	0	2	1	0	1	0			
J 703	J 703	J4-7 Do you trace schematic diagrams of laser systems or component circuits	1	1	3	1	0	2	1	2	0	1	1	0	0	0			
J 704	J 704	J4-8 Do you troubleshoot laser systems to major subassemblies	0	1	3	0	0	2	1	3	0	1	1	0	1	0			
J 705	J 705	J4-9 Do you troubleshoot laser systems to circuit level components	1	1	1	0	0	1	1	1	0	1	1	0	0	0			
J 706	J 706	J4-10 Do you adjust or calibrate laser systems or components	1	1	1	1	0	2	1	2	0	1	1	0	0	0			
J 707	J 707	J4-11 Do you trace block diagrams of infrared systems or subassemblies	0	1	2	0	1	1	1	1	0	1	2	0	0	0			
J 708	J 708	J4-12 Do you trace schematic diagrams of infrared systems or component circuits	1	1	1	0	1	1	1	1	0	1	1	0	0	0			
J 709	J 709	J4-13 Do you troubleshoot infrared systems to major subassemblies	0	1	2	0	1	1	1	0	0	1	1	0	0	0			
J 710	J 710	J4-14 Do you troubleshoot infrared systems circuit level components	1	1	1	0	1	1	1	0	0	0	1	0	0	0			
J 711	J 711	J4-15 Do you inspect, clean, or service infrared systems or components	1	1	1	0	1	1	1	0	0	1	1	0	0	0			
J 712	J 712	J4-16 Do you adjust or calibrate infrared systems or components	1	1	1	0	1	0	1	0	0	1	1	0	0	0			

## Report Option Table for Modules

Option	Status
Primary Sort	Inventory Sequence
Secondary Sort	Not Used
Print Suppress	Not Used

## Report Option Table for Tasks

Option	Status
Primary Sort	Inventory Sequence
Secondary Sort	Not Used
Print Suppress	Not Used

## Description of Reported Module Factors

Col	Factor	Source vector	Title	Number Members	Mean	S.D.	Max	Min	Valid
1	TITLE		Module Statement						

## Description of Reported Task Factors

Col	Factor	Source vector	Title	Number Members	Mean	S.D.	Max	Min	Valid
1	TITLE		Task Statement						
2	F0097	GP0136/PHP	All DAFSC 455X4	59	31.88	28.14	96.61	.00	712
3	F0098	GP0138/PHP	All DAFSC 455X6	83	34.98	25.99	100.00	.00	712
4	F0100	GP0140/PHP	All DAFSC 456X1A	113	24.68	18.84	98.23	.00	712
5	F0101	GP0141/PHP	All DAFSC 456X1B	107	20.11	18.86	94.39	.00	712
6	F0025	GP0028/PHP	All DAFSC 49350	258	6.84	12.05	88.76	.00	712



Electronic Principles Inventory (EPI) data for Air Force specialties is presented below in Electronic Fundamentals/Applications order. Data for this report was collected from job incumbents during the period March 1987 - September 1988

Percent members responding "YES" is shown for each specialty listed. Where skill level is not specified, both 5 and 7 skill levels are included (e.g., DAFSC 000X0 includes 00050 and 00070).

For assistance in using this EPI printout phone USAFOMC/ONVA, at AUTOVON 487-6623.

D	T Task	Task Title	455	455	456	456	493
Y Nbr			X4	X6	X1A	X1B	50

0001 STS 1 Electronic Fundamentals/  
Applications dated 20 Feb 1987

0002 1. Basic Terms

0003 1a. Metric Notation

A	1	Al-1 Do you use metric terms (example milli, kilo, mega)	81	76	73	72	78
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0004 1b. DC Terms

A	2	Al-2 Do you use basic DC electrical/electronic terms	97	96	95	93	89
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0005 1c. AC Terms

A	3	Al-3 Do you use basic AC electrical/electronic terms	97	96	93	93	83
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0006 2. Basic Circuits

D	T	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
0007		2a. Theory of operation					
A 4		A1-4 Do you trace schematic or block diagrams of circuits containing conductors, fuses, lamps, switches, or batteries	97	96	89	94	41
0008		2b. Troubleshoot circuits					
A 5		A1-5 Do you troubleshoot circuits containing conductors, fuses, lamps, switches, or batteries	95	96	86	94	57
0009		3. Basic Circuit Calculations					
0010		3a. DC					
A 6		A1-6 Do you calculate values of DC voltage, current, resistance, or power	69	48	43	47	40
A 12		A1-12 Do you calculate the value of a resistor required for a circuit	15	41	23	26	10
0011		3b. AC					
A 7		A1-7 Do you calculate values of AC effective voltage, average voltage, or peak-to-peak voltage	66	51	42	39	34
A 8		A1-8 Do you calculate values of frequency, phase relationship, or wave length	64	51	46	50	45
0012		4. Resistors					
0013		4a. Theory of operation					
A 9		A1-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79	15

D T Y	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
A 11	Al-11 Do you calibrate or adjust circuits by using variable resistors	85	92	73	71	17
0014	4b. Isolate faulty resistors 2b					
A 10	Al-10 Do you troubleshoot circuits to isolate a faulty resistor	53	83	59	55	14
A 14	Al-14 Do you ohm check resistors	69	82	63	66	13
0015	4c. Color code B					
A 13	Al-13 Do you determine ohmic value of a resistor using the color code	27	70	48	49	12
0016	5. Relays/Solenoids					
0017	5a. Relay theory of operation B					
A 15	Al-15 Do you trace schematic or block diagrams of circuits containing relays	93	94	82	82	14
A 17	Al-17 Do you adjust relays	14	61	17	17	5
A 18	Al-18 Do you perform tasks on contacts, cores, coils, armatures, or springs	14	42	26	21	4
0018	5b. Isolate faulty relays 2b					
A 16	Al-16 Do you troubleshoot circuits to isolate a faulty relay	90	92	73	76	16
A 19	Al-19 Do you continuity check relays	78	83	62	69	10
0019	5c. Solenoid theory of operation -					
A 77	A2-33 Do you trace schematic or block diagrams of circuits containing solenoids	75	47	28	17	2
A 79	A2-35 Do you perform maintenance on solenoid component parts	46	14	11	4	1

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0020 5d. Isolate faulty solenoids

A 78 A2-34 Do you troubleshoot circuits to isolate a faulty solenoid 73 42 27 16 2

0021 6. Inductors

0022 6a. Theory of operation

B

A 20 A1-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils 39 84 56 54 5  
 A 25 A1-25 Do you calibrate or adjust circuits by using variable inductors 14 63 25 18 4

0023 6b. Isolate faulty inductors

2b

A 21 A1-21 Do you troubleshoot circuits to isolate a faulty inductor, choke, or choke coil 29 77 45 37 4  
 A 26 A1-26 Do you ohm check inductors 24 69 42 35 5

0024 6c. Calculations

B

A 22 A1-22 Do you calculate values of circuit total inductance 10 34 14 11 5  
 A 23 A1-23 Do you calculate values of circuit or component inductive reactance 10 30 12 10 4  
 A 24 A1-24 Do you calculate values of circuit voltage or current in circuits containing inductors 10 34 19 11 5

0025 7. Capacitors

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0026 7a. Theory of operation B

A 27 A1-27 Do you trace schematic or block diagrams of circuits containing capacitors 85 93 73 71 8  
A 32 A1-32 Do you calibrate or adjust circuits using variable capacitors 19 70 34 25 4

0027 7b. Isolate faulty capacitors 2b

A 28 A1-28 Do you troubleshoot circuits to isolate a faulty capacitor 53 84 58 49 8  
A 33 A1-33 Do you ohm check capacitors 41 76 51 40 5

0028 7c. Calculations

A 29 A1-29 Do you calculate values of circuit total capacitance 14 33 18 14 5  
A 30 A1-30 Do you calculate values of circuit or component capacitive reactance 14 33 17 11 5  
A 31 A1-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors 19 39 22 17 5

0029 7d. Color code B

A 34 A1-34 Do you use capacitor color codes in your present job 14 23 9 14 3

0030 8. Transformers

0031 8a. Theory of operation B

A 35 A1-35 Do you trace schematic or block diagrams of circuits containing transformers 86 93 64 61 9  
A 39 A1-39 Do you calibrate or adjust circuits using variable transformers 20 51 27 19 6

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0032	8b. Isolate faulty transformers 2b					
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A 36	A1-36 Do you troubleshoot circuits to isolate a faulty transformer	83	89	56	50	9
A 40	A1-40 Do you ohm check transformers	51	75	38	36	7
A 41	A1-41 Do you measure transformer output voltage	66	77	50	48	9
-----						
0033	8c. Calculations -					
-----						
A 37	A1-37 Do you calculate transformer voltage or current step-up or step-down ratios	27	46	24	21	6
A 38	A1-38 Do you calculate impedance of transformers	17	31	9	11	5
-----						
0034	9. Three Phase Transformers					
-----						
0035	9a. Theory of operation B					
-----						
A 42	A1-42 Do you trace schematic or block diagrams of circuits containing three phase transformers	73	82	46	47	3
A 44	A1-44 Do you adjust three phase transformers	17	37	20	21	3
-----						
0036	9b. Isolate faulty three phase transformers -					
-----						
A 43	A1-43 Do you troubleshoot circuits to isolate a faulty three phase transformer	68	77	40	41	3
-----						
0037	10. DC Motors					
-----						
0038	10a. Theory of operation B					
-----						
A 45	A2-1 Do you trace schematic or block diagrams of circuits containing DC motors	37	57	44	29	2

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A	48	A2-4 Do you perform tasks on DC motor component parts	7	16	12	11 2
-----						
0039		10b. Isolate faulty DC motors 2b				
-----						
A	46	A2-2 Do you troubleshoot circuits to isolate a faulty DC motor	36	54	42	28 3
-----						
0040		10c. Troubleshoot motors 2b				
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A	47	A2-3 Do you troubleshoot DC motor component parts	7	18	18	8 2
-----						
0041		11. AC Motors				
-----						
0042		11a. Theory of operation B				
-----						
A	49	A2-5 Do you trace schematic or block diagrams of circuits containing AC motors	31	52	43	26 2
A	52	A2-8 Do you perform tasks on AC motor component parts	7	13	12	7 2
-----						
0043		11b. Isolate faulty AC motors 2b				
-----						
A	50	A2-6 Do you troubleshoot circuits to isolate a faulty AC motor	29	47	40	23 3
-----						
0044		11c. Troubleshoot motors 2b				
-----						
A	51	A2-7 Do you troubleshoot AC motor component parts	8	17	15	7 2
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0045		12. DC Generators				

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0046	12a.	Theory of operation					
A 53	A2-9	Do you trace schematic or block diagrams of circuits containing DC generators	8	28	17	19	3
A 56	A2-12	Do you perform tasks on component parts of DC generators	3	16	4	9	2
0047	12b.	Isolate faulty DC generators					
A 54	A2-10	Do you troubleshoot to isolate a faulty DC generator	8	29	12	16	6
0048	12c.	Troubleshoot DC generators					
A 55	A2-11	Do you troubleshoot DC generator component parts	3	17	4	10	3
0049	13.	AC Generators					
0050	13a.	Theory of operation					
A 57	A2-13	Do you trace schematic or block diagrams of circuits containing AC generators	10	24	13	13	3
A 60	A2-16	Do you perform tasks on component parts of AC generators	5	10	4	6	3
0051	13b.	Isolate faulty AC generators					
A 58	A2-14	Do you troubleshoot circuits to isolate a faulty AC generator	8	24	9	9	4
0052	13c.	Troubleshoot AC generators					
A 59	A2-15	Do you troubleshoot AC generator component parts	5	12	4	7	2



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0053 14. Alternators

0054 14a. Theory of operation

A 61 A2-17 Do you trace schematic or block diagrams of circuits containing alternators 2 5 1 2 1  
 A 64 A2-20 Do you perform tasks on component parts of alternators 2 2 1 2 0

0055 14b. Isolate faulty alternators

A 62 A2-18 Do you troubleshoot circuits to isolate a faulty alternator 2 4 1 2 1

0056 14c. Troubleshoot alternators

A 63 A2-19 Do you troubleshoot alternator component parts 2 2 1 2 0

0057 15. Synchro/Servos

0058 15a. Theory of operation B

A 65 A2-21 Do you trace schematic or block diagrams of circuits containing synchros or servos 20 81 16 11 1  
 A 68 A2-24 Do you perform tasks on component parts of synchros or servos 8 45 9 7 0

0059 15b. Isolate faulty synchro/servos 2b

A 66 A2-22 Do you troubleshoot circuits to isolate a faulty synchro or servo 19 78 16 10 2

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0060 15c. Troubleshoot synchro/servos 2b

A 67 A2-23 Do you troubleshoot synchro or servo component parts 8 53 11 7 0

0061 16. Choppers (Synchronous Vibrators)

0062 16a. Theory of operation B

A 69 A2-25 Do you trace schematic or block diagrams of circuits containing choppers 3 8 4 4 0

0063 16b. Isolate faulty choppers 2b

A 70 A2-26 Do you troubleshoot circuits to isolate a faulty chopper 3 6 3 4 1  
A 71 A2-27 Do you measure chopper coil excitation frequency 2 2 1 3 1  
A 72 A2-28 Do you measure chopper coil voltage-current phase relationship 2 2 1 3 1

0064 17. Transducers

0065 17a. Theory of operation B

A 73 A2-29 Do you trace schematic or block diagrams of circuits containing transducers 20 8 7 9 0  
A 75 A2-31 Do you calibrate or adjust transducers 7 5 2 7 0  
A 76 A2-32 Do you repair, clean or lubricate transducers 5 4 4 6 0

0066 17b. Isolate faulty transducers 2b

A 74 A2-30 Do you troubleshoot circuits to isolate a faulty transducer 17 8 6 9 0

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## 0067 18. Meter Movements

## 0068 18a. Theory of operation

B

A 80 A2-36 Do you trace schematic or block diagrams of circuits 15 73 36 29 6  
containing meter movements  
A 82 A2-38 Do you perform maintenance on meter movement 3 41 12 12 3  
mechanical parts

## 0069 18b. Isolate faulty meter movements

2b

A 81 A2-37 Do you troubleshoot circuits to isolate a faulty 10 77 35 26 5  
meter movement

## 0070 19. Solid State Diodes

## 0071 19a. Theory of operation

B

A 83 A3-1 Do you trace schematic or block diagrams of circuits 86 89 70 73 6  
containing diodes

## 0072 19b. Isolate faulty solid state diodes

2b

A 84 A3-2 Do you troubleshoot circuits to isolate a faulty diode 66 83 60 57 7  
A 85 A3-3 Do you check diodes using an ohmmeter 56 82 61 58 6

## 0073 19c. Specifications

B

A 86 A3-4 Do you use diode characteristic curves 27 28 14 10 3  
A 87 A3-5 Do you use diode substitution information 15 46 25 13 3

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0074	19d.	Color code				
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A 88	A3-6	Do you use diode color codes	14	19	7	17 3
-----						
0075	20.	Bipolar Junction Transistors				
-----						
0076	20a.	Theory of operation				
-----						
A 89	A3-7	Do you trace schematic or block diagrams of circuits containing transistors	92	88	67	68 7
-----						
0077	20b.	Isolate faulty transistors				
-----						
A 90	A3-8	Do you troubleshoot circuits to isolate a faulty transistor	64	82	57	46 7
A 91	A3-9	Do you check transistors using an ohmmeter	46	75	55	43 5
A 92	A3-10	Do you check transistors using transistor testers	19	60	21	17 3
-----						
0078	20c.	Specifications				
-----						
A 93	A3-11	Do you use transistor characteristic curves	10	25	12	5 2
A 94	A3-12	Do you use transistor substitution information	12	48	24	16 2
-----						
0079	21.	Integrated Circuits				
-----						
0080	21a.	Familiarization				
-----						
A 95	A3-13	Do you trace schematic or block diagrams of circuits containing integrated circuits (IC)	92	72	69	65 7

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0081 21b. Isolate faulty integrated circuits 2b

A 96 A3-14 Do you troubleshoot circuits to isolate a faulty IC 71 65 54 42 6

0082 21c. Specifications B

A 97 A3-15 Do you use IC substitution information 39 42 27 16 4

0083 22. Solid State Special Purpose Devices  
(SCR, Zener Diode, Tunnel Diode, LED,  
LCD, UJT, JFET, MOSFET)

0084 22a. Theory of operation B

A 98 A3-16 Do you trace schematic or block diagrams of circuits  
containing solid-state special purpose devices 68 66 48 51 6  
A 100 A3-18 Do you perform tasks on varactors/varicaps 10 52 22 16 2  
A 101 A3-19 Do you perform tasks on tunnel diodes 10 33 19 14 2  
A 102 A3-20 Do you perform tasks on field effect transistors (FET) 19 52 28 24 2  
A 103 A3-21 Do you perform tasks on unijunction transistors (UJT) 8 31 24 20 2  
A 104 A3-22 Do you perform tasks on zener diodes 49 59 42 36 3  
A 105 A3-23 Do you perform tasks on liquid crystal displays (LCD) 20 41 27 25 3  
A 106 A3-24 Do you perform tasks on pin diodes 34 25 36 32 1  
A 107 A3-25 Do you perform tasks on light emitting diodes (LED) 49 52 50 36 5  
A 108 A3-26 Do you perform tasks on fantail transistors 5 14 6 1 0  
A 109 A3-27 Do you perform tasks on silicon controlled rectifiers  
(SCR) 14 41 32 23 1  
A 110 A3-28 Do you perform tasks on triacs 3 18 8 4 1  
A 111 A3-29 Do you perform tasks on programmable unijunction  
transistors (PUT) 7 8 3 6 0  
A 112 A3-30 Do you perform tasks on silicon controlled  
switches (SCS) 5 18 7 6 0  
A 113 A3-31 Do you perform tasks on silicon unilateral  
switches (SUS) 5 12 4 3 1  
A 114 A3-32 Do you perform tasks on step recovery diodes (SRD) 3 6 6 8 0  
A 115 A3-33 Do you perform tasks on field effect diodes (FED) 7 31 17 7 0  
A 116 A3-34 Do you perform tasks on DIAC (Bi-directional  
trigger diode) 2 11 4 4 0  
A 117 A3-35 Do you perform tasks on varistors 10 40 16 14 2  
A 118 A3-36 Do you perform tasks on metal oxide varistors (MOV) 2 12 4 4 1

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 A 119 A3-37 Do you perform tasks on schottky diodes  
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 7 33 11 17 1

0085 22b. Isolate faulty special purpose devices 2b

A 99 A3-17 Do you troubleshoot circuits to isolate a faulty solid-state special purpose device  
 61 65 41 41 8

0086 23. Electron Tubes

0087 23a. Theory of operation B

A 120 A4-1 Do you trace block diagrams of circuits containing electron tubes 68 65 35 31 2  
 A 121 A4-2 Do you trace schematic diagrams of electron tube circuits 66 63 31 26 2  
 A 125 A4-6 Do you perform tasks on diode tubes 7 34 19 15 2  
 A 126 A4-7 Do you perform tasks on triode tubes 15 43 21 12 1  
 A 127 A4-8 Do you perform tasks on tetrode tubes 5 39 19 9 1  
 A 128 A4-9 Do you perform tasks on pentode tubes 7 42 22 10 1  
 A 129 A4-10 Do you perform tasks on beam power tubes 41 7 12 5 0  
 A 130 A4-11 Do you perform tasks on gas tubes 14 20 13 7 1  
 A 131 A4-12 Do you perform tasks on phantastrons 3 4 2 2 0  
 A 132 A4-13 Do you perform tasks on neon tubes 3 8 10 3 0  
 A 133 A4-14 Do you perform tasks on xenon tubes 3 2 4 0 0  
 A 134 A4-15 Do you perform tasks on nixie tubes 7 16 12 3 1

0088 23b. Isolate faulty tubes

A 122 A4-3 Do you troubleshoot circuits to isolate a faulty electron tube  
 66 60 33 31 2

0089 23c. Specifications

A 123 A4-4 Do you use electron tube characteristic curves  
 A 124 A4-5 Do you use electron tube substitution manuals or charts  
 47 10 12 7 0  
 15 18 11 7 0

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0090 24. Cathode Ray Tubes (CRT)

0091 24a. Theory of operation B

A 135	A4-16 Do you trace block diagrams of circuits containing cathode ray tubes (CRT)	36	7	41	44	2
A 136	A4-17 Do you trace schematic diagrams of CRT circuits	31	6	38	37	1
A 138	A4-19 Do you adjust or calibrate circuits that control CRT operations	32	7	38	40	3
A 139	A4-20 Do you perform tasks on electrostatic CRT	14	6	24	20	1
A 140	A4-21 Do you perform tasks on electromagnetic CRT	20	5	27	23	1

0092 24b. Isolate faulty CRTs 2b

A 137	A4-18 Do you troubleshoot to isolate a faulty CRT	36	7	40	42	3
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0093 25. Solder/Desolder

0094 25a. Terminal connections 2b

A 141	A5-1 Do you solder or desolder hardware connections	78	96	89	87	30
A 142	A5-2 Do you solder or desolder component connections such as resistors, capacitors, diodes, transformers, etc	49	83	68	68	13

0095 25b. P C Boards 2b

A 143	A5-3 Do you solder or desolder printed circuit board connections	34	81	63	51	10
A 144	A5-4 Do you solder or desolder multi-layer circuit board connections	25	54	31	23	5
A 145	A5-5 Do you perform high reliability soldering	46	80	61	61	14

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0096	25c. Multipin connectors 2b					
A 149	A5-9 Do you repair or fabricate connectors or cables on multiconductor cables	63	78	86	87	23
A 152	A5-12 Do you repair or fabricate connectors or cables on ribbon cables	19	27	27	23	14
0097	25d. Coaxial connectors					
A 150	A5-10 Do you repair or fabricate connectors or cables on coaxial cables	78	96	93	93	26
A 151	A5-11 Do you repair or fabricate connectors or cables on triaxial cables	19	36	35	29	10
0098	26. Assemble Solderless Connectors					
0099	26a. Crimp 2b					
A 146	A5-6 Do you use crimping tool to repair or make connections	88	95	95	93	33
A 147	A5-7 Do you use wire wrap tool to make connections	95	43	39	36	43
A 148	A5-8 Do you use punch-on tool to make connections	19	25	14	21	29
0100	26b. Coaxial 2b					
A 150	A5-10 Do you repair or fabricate connectors or cables on coaxial cables	78	96	93	93	26
A 151	A5-11 Do you repair or fabricate connectors or cables on triaxial cables	19	36	35	29	10
0101	26c. Multipin 2b					
A 149	A5-9 Do you repair or fabricate connectors or cables on multiconductor cables	63	78	86	87	23
A 152	A5-12 Do you repair or fabricate connectors or cables on ribbon cables	19	27	27	23	14



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## 0102 27. Use Test Equipment Usage

## 0103 27a. Multimeter, analog 2b

B 153	B1-1 Do you use the multimeter to measure DC voltage values	95	100	98	93	74
B 154	B1-2 Do you use the multimeter to measure AC voltage values	97	98	93	87	54
B 155	B1-3 Do you use the multimeter to extend the range of voltmeters using external shunts	22	36	24	20	13
B 156	B1-4 Do you use the multimeter to measure DC current values	73	72	54	63	53
B 157	B1-5 Do you use the multimeter to measure AC current values	71	65	55	60	38
B 158	B1-6 Do you use the multimeter to extend the range of ammeters using external shunts	14	30	13	14	11
B 159	B1-7 Do you use the multimeter to measure circuit resistance	85	86	69	75	48
B 160	B1-8 Do you use the multimeter to measure component resistance	86	90	65	69	24

## 0104 27b. Oscilloscope 2b

B 161	B2-1 Do you use the oscilloscope to measure time to determine frequency	85	65	77	71	38
B 162	B2-2 Do you use the oscilloscope to measure time (rise, fall, pulse width, etc)	97	72	79	74	38
B 163	B2-3 Do you use the oscilloscope to measure AC voltage	75	71	78	71	33
B 164	B2-4 Do you use the oscilloscope to measure DC voltage	88	71	82	68	55
B 165	B2-5 Do you use the oscilloscope to measure ripple voltages	39	58	58	58	19
B 166	B2-6 Do you use the oscilloscope to measure phase jitters	41	31	19	16	35
B 167	B2-7 Do you use the oscilloscope to observe signal/data patterns	85	71	70	57	62
B 168	B2-8 Do you use the oscilloscope to observe lissajous patterns	8	60	10	8	13
B 169	B2-9 Do you use the oscilloscope to observe phase relationships	75	63	53	47	52
B 170	B2-10 Do you use attenuator probes with oscilloscopes	66	63	60	57	22
B 171	B2-11 Do you use delay time multipliers with oscilloscopes	39	30	22	21	9

## 0105 27c. Signal Generator 2b

B 172	B3-1 Do you use signal generators (SG) to perform operational checks	68	87	70	64	60
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B 173	B3-2	Do you use SG to perform alignments, adjustments, or calibrations	76	87	67	58	46
B 174	B3-3	Do you use SG to troubleshoot circuits	59	71	63	52	68
0106	27d.	Frequency counter					
B 185	B4-1	Do you use frequency counters	97	99	75	73	74
0107	27e.	Spectrum Analyzer					
B 186	B4-2	Do you use spectrum analyzers	93	95	71	71	41
0108	27f.	Field strength tester					
B 187	B4-3	Do you use field strength testers	8	7	5	7	7
0109	27g.	Multimeter, digital					
B 188	B4-4	Do you use digital multimeters	97	96	93	79	71
0110	27h.	Digital logic probe					
B 189	B4-5	Do you use digital logic probes	24	43	36	18	9
0111	27i.	Capacitor tester					
B 190	B4-6	Do you use capacitance testers	8	25	12	9	9
0112	27j.	Capacitor substitution box					
B 191	B4-7	Do you use capacitor substitution boxes	5	13	4	4	7

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0113 27k. DC restorer

B 192 B4-8 Do you use DC restorers (CRT rejuvenators)

7

0114 27l. Logic current tracer

B 193 B4-9 Do you use logic current tracers

5

0115 27m. Tube tester

B 194 B4-10 Do you use tube testers

6

0116 27n. Logic pulser

B 195 B4-11 Do you use logic pulsers

6

0117 27o. Logic analyzer

2b

B 196 B4-12 Do you use logic analyzers

8

0118 27p. Signature analyzer

B 197 B4-13 Do you use signature analyzers

7

0119 27q. Reflectometer

2b

B 198 B4-14 Do you use reflectometers

7

0120 28. Transistor Amplifier Circuits (Common  
Emitter, Common Collector, Common Base)

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					X4	X6	X1A	X1B	50

0121 28a. Theory of operation

0122 28a(1). Amplifier circuits B

C 199	Cl-1 Do you trace block diagrams of circuits containing transistor amplifiers	71	80	50	46	12
C 260	Cl-2 Do you trace schematic diagrams of transistor amplifier circuits	51	73	46	38	6
C 204	Cl-6 Do you adjust or align transistor amplifiers	15	53	27	21	19
C 206	Cl-8 Do you calculate values of transistor amplifier voltage, current or power gain	20	23	19	9	8
C 207	Cl-9 Do you work on compound-connected (Darlington Pair) transistor amplifiers	3	29	23	11	2
C 208	Cl-10 Do you work on cascade-connected transistor amplifiers	10	29	25	16	2
C 209	Cl-11 Do you work on paraphase transistor amplifiers	5	18	11	11	2
C 210	Cl-12 Do you work on push-pull transistor amplifiers	22	60	35	23	4
C 211	Cl-13 Do you work on audio transistor amplifiers	3	76	30	10	21
C 212	Cl-14 Do you work on wideband transistor amplifiers	20	48	29	22	7
C 213	Cl-15 Do you work on IF transistor amplifiers	54	71	36	28	3
C 214	Cl-16 Do you work on RF transistor amplifiers	68	71	47	38	5
C 215	Cl-17 Do you work on buffer transistor amplifiers	24	54	19	15	3
C 216	Cl-18 Do you work on complementary symmetry transistor amplifiers	5	23	13	12	2
C 217	Cl-19 Do you work on DC transistor amplifiers (switching applications)	29	49	26	22	4

0123 28a(2). Stabilization circuits B

C 218	C2-1 Do you trace schematic diagrams of amplifier stabilization circuits	29	47	30	15	2
C 220	C2-3 Do you perform tasks on emitter (swamping) resistor stabilization amplifiers	17	54	27	17	2
C 221	C2-4 Do you perform tasks on self-bias stabilization amplifiers	14	43	24	11	2
C 222	C2-5 Do you perform tasks on thermistor stabilization amplifiers	31	46	24	12	2
C 223	C2-6 Do you perform tasks on diode stabilization amplifiers	22	47	28	17	1
C 224	C2-7 Do you perform tasks on double diode stabilization amplifiers	10	23	10	7	1

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## 0124 28a(3). Coupling circuits

B

C 225	C3-1 Do you trace block diagrams of circuits containing coupling circuits	47	60	41	36	3
C 226	C3-2 Do you trace schematic diagrams of coupling circuits	39	57	38	31	2
C 229	C3-5 Do you perform tasks on direct coupling circuits	36	55	36	31	3
C 230	C3-6 Do you perform tasks on capacitive-resistive coupling circuits	19	41	28	21	2
C 231	C3-7 Do you perform tasks on capacitive-inductive coupling circuits	24	49	28	17	2
C 232	C3-8 Do you perform tasks on transformer coupling circuits	25	57	30	21	3
C 233	C3-9 Do you perform tasks on optical coupling circuits	15	11	5	4	1

## 0125 28b. Isolate faulty amplifier circuits

2b

C 201	C1-3 Do you troubleshoot to isolate a faulty transistor amplifier	47	75	41	31	14
C 205	C1-7 Do you measure transistor amplifier voltage, current, or power gain	36	57	35	27	14
C 227	C3-3 Do you troubleshoot circuits to isolate a faulty coupling circuit	34	58	32	24	3

## 0126 28c. Troubleshoot circuits

2b

C 202	C1-4 Do you troubleshoot transistor amplifiers to circuit level components	22	63	35	23	9
C 203	C1-5 Do you troubleshoot transistor amplifier distortion	10	43	23	13	8
C 219	C2-2 Do you troubleshoot amplifier stabilization circuits to circuit level components	20	43	25	8	2
C 228	C3-4 Do you troubleshoot coupling circuits to circuit level components	17	47	27	18	2

## 0127 29. Electron Tube Amplifiers

D	T	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
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0128 29a. Theory of operation

C 234	C4-1 Do you trace block diagrams of circuits containing electron tube amplifiers	80	51	28	23	2
C 235	C4-2 Do you trace schematic diagrams of electron tube amplifiers	71	48	24	16	1
C 239	C4-6 Do you adjust or align electron tube amplifiers	63	41	20	13	2
C 241	C4-8 Do you calculate values of electron tube amplifier voltage, current, or power gain	69	17	11	8	1
C 242	C4-9 Do you perform tasks on paraphase electron tube amplifiers	3	18	14	5	0
C 243	C4-10 Do you perform tasks on push-pull electron tube amplifiers	5	27	17	5	2
C 244	C4-11 Do you perform tasks on audio electron tube amplifiers	5	31	12	2	2
C 245	C4-12 Do you perform tasks on voltage regulator electron tube amplifiers	31	29	18	7	1
C 246	C4-13 Do you perform tasks on common grid electron tube amplifiers	31	35	18	7	0
C 247	C4-14 Do you perform tasks on common cathode electron tube amplifiers	54	34	17	8	0
C 248	C4-15 Do you perform tasks on cathode follower electron tube amplifiers	15	28	15	7	0

0129 29b. Isolate faulty tube amplifiers

C 236	C4-3 Do you troubleshoot to isolate a faulty electron tube amplifier	78	46	24	21	1
C 240	C4-7 Do you measure electron tube amplifier voltage, current, or power gain	76	40	19	22	2

0130 29c. Troubleshoot circuits

C 237	C4-4 Do you troubleshoot electron tube amplifiers to circuit level components	34	42	16	10	1
C 238	C4-5 Do you troubleshoot electron tube amplifier distortion	46	30	14	10	0

0131 30. Operational Amplifiers

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Y Nbr

Task Title

455 455 456 456 493  
X4 X6 X1A X1B 50

## 0132 30a. Theory of operation

B

C 249	C5-1 Do you trace block or schematic diagrams of circuits containing operational amplifiers (op amps)	59	46	36	28	6
C 251	C5-3 Do you calculate op amp gain	19	22	12	9	10
C 252	C5-4 Do you adjust op amp bias, offsets, or drift	25	27	18	14	10
C 253	C5-5 Do you use or apply operational amplifiers for general purpose (inverting or non-inverting)	39	45	26	19	5
C 254	C5-6 Do you use or apply operational amplifiers as differential/comparators	20	29	20	15	1
C 255	C5-7 Do you use or apply operational amplifiers for summing	19	28	17	9	1
C 256	C5-8 Do you use or apply operational amplifiers for unity gain amplifier (buffer)	22	29	19	10	5
C 257	C5-9 Do you use or apply operational amplifiers as active filters	17	23	7	8	2
C 258	C5-10 Do you use or apply operational amplifiers as oscillators	32	34	23	20	3
C 259	C5-11 Do you use or apply operational amplifiers as integrators	15	18	11	7	1
C 260	C5-12 Do you use or apply operational amplifiers for differentiators	12	20	12	8	2
C 261	C5-13 Do you use or apply operational amplifiers for power supplies (voltage regulators)	53	45	27	25	5
C 262	C5-14 Do you use or apply operational amplifiers as analog/digital (A/D) digital/analog (D/A) converters	68	35	29	20	16
C 263	C5-15 Do you use or apply operational amplifiers as multivibrators	36	36	26	14	3
C 264	C5-16 Do you use or apply operational amplifiers as modulators/demodulators	29	47	25	19	9

## 0133 30b. Isolate faulty Op Amps

C 250	C5-2 Do you troubleshoot to isolate a faulty op amp circuit	46	41	29	20	11
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## 0134 31. Magnetic Amplifiers

D	T Task	Y Mbr	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
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0135 31a. Theory of operation

C 265	C6-1 Do you trace block diagrams of circuits containing magnetic amplifiers		5	2	6	7	0	
C 266	C6-2 Do you trace schematic diagrams of magnetic amplifier circuits		5	1	5	6	1	
C 269	C6-5 Do you adjust magnetic amplifiers or components		3	1	5	5	0	

0136 31b. Isolate faulty magnetic amplifiers

C 267	C6-3 Do you troubleshoot to isolate a faulty magnetic amplifier		7	1	5	5	0	
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0137 31c. Troubleshoot circuits

C 268	C6-4 Do you troubleshoot magnetic amplifiers to circuit level components		0	1	4	4	0	
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0138 32. Saturable Reactors

0139 32a. Theory of operation

C 270	C6-6 Do you trace block diagrams of circuits containing saturable reactors		3	5	11	6	0	
C 271	C6-7 Do you trace schematic diagrams of saturable reactor circuits		3	6	10	4	0	
C 274	C6-10 Do you adjust saturable reactor circuits or components		2	6	5	3	0	

0140 32b. Isolate faulty saturable reactors

C 272	C6-8 Do you troubleshoot to isolate a faulty saturable reactor		3	6	8	4	0	
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D	T Task	Task Title	455	456	456	493
Y Nbr			X4	X6	X1A	X1B 50

0141 32c. Troubleshoot circuits

C 273	C6-9 Do you troubleshoot saturable reactors to circuit level components	3	5	6	2	0
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0142 33. Power Supply Circuits (Half-wave, Full-wave, Full-wave bridge)

0143 33a. Theory of operation

0144 33a(1). Rectifiers (Half-wave, Full-wave, B Full-wave bridge)

D 275	D1-1 Do you trace block diagrams of circuits containing power supplies	92	90	75	71	12
D 276	D1-2 Do you trace schematic diagrams of power supply circuits	88	81	60	56	8
D 279	D1-5 Do you align or adjust power supplies	56	82	66	59	9
D 280	D1-6 Do you perform tasks on half-wave rectifier power supplies	31	63	36	29	3
D 281	D1-7 Do you perform tasks on full-wave rectifier power supplies	34	66	36	29	3
D 282	D1-8 Do you perform tasks on full-wave bridge rectifier power supplies	27	72	40	31	4
D 283	D1-9 Do you perform tasks on three-phase rectifier power supplies	42	47	34	28	1

0145 33a(2). Filters (Capacitive, Inductive, B L-Section, Pi-Section)

D 288	D2-1 Do you trace block diagrams of circuits containing power supply filters	59	52	40	31	2
D 289	D2-2 Do you trace schematic diagrams of power supply filters	42	46	33	23	2
D 292	D2-5 Do you perform tasks on capacitive power supply filters	19	39	32	21	2
D 293	D2-6 Do you perform tasks on inductive power supply filters	17	37	27	18	1
D 294	D2-7 Do you perform tasks on L-type power supply filters	8	33	25	13	2

D	T Task	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
D 295	D2-8	Do you perform tasks on Pi-type power supply filters	8	33	20	12	2
D 296	D2-9	Do you perform tasks on T-type power supply filters	7	35	13	11	2
D 297	D2-10	Do you perform tasks on resistive capacitive (RC) power supply filters	19	39	31	18	2
D 298	D2-11	Do you perform tasks on inductive capacitive (LC) power supply filters	20	40	29	17	2

0146 33b. Isolate faulty power supplies 2b

D 277	D1-3	Do you troubleshoot circuits to isolate a faulty power supply	92	82	71	62	23
D 290	D2-3	Do you troubleshoot circuits to isolate a faulty power supply filter	46	48	35	23	3

0147 33c. Troubleshoot circuits 2b

D 278	D1-4	Do you troubleshoot power supplies to circuit level components	39	65	39	24	6
D 291	D2-4	Do you troubleshoot power supply filters to circuit level components	14	37	27	14	2

0148 34. Voltage Regulators (Shunt, Series EVR, IC EVR)

0149 34a. Theory of operation B

D 299	D3-1	Do you trace block diagrams of circuits containing power supply voltage regulators	85	66	44	40	3
D 300	D3-2	Do you trace schematic diagrams of power supply voltage regulator circuits	69	61	41	31	2
D 303	D3-5	Do you perform tasks on variable resistor power supply voltage regulators	39	57	35	27	2
D 304	D3-6	Do you perform tasks on zener diode power supply voltage regulators	37	47	33	19	2
D 305	D3-7	Do you perform tasks on transistor series power supply voltage regulators	29	43	27	17	2
D 306	D3-8	Do you perform tasks on IC power supply voltage regulators	20	33	20	9	2
D 307	D3-9	Do you perform tasks on pulse width modulator power supply voltage regulators	17	23	15	9	1

D	T Task	Y Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
D 308	D3-10 Do you perform tasks on transistor series power supply voltage regulators with current limiting							
				29	40	20	11	2
D 309	D3-11 Do you perform tasks on crow bar power supply voltage regulators							
				59	40	7	3	1
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0150	34b. Isolate faulty voltage regulators			2b				
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D 301	D3-3 Do you troubleshoot circuits to isolate a faulty power supply voltage regulator			81	58	39	32	4
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0151	34c. Troubleshoot circuits			2b				
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D 302	D3-4 Do you troubleshoot power supply voltage regulators to circuit level components			20	53	31	21	2
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0152	35. Resistive/Capacitive/Inductive (RCL) Circuits							
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0153	35a. Basic operation							
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E 310	E1-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits			39	47	29	25	3
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0154	35b. Resonant operation							
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E 312	E1-3 Do you trace schematic or block diagrams of circuits containing resonant RCL circuits			25	43	24	18	3
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0155	35c. Troubleshoot circuits							
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E 311	E1-2 Do you troubleshoot RCL circuits to circuit level components			19	47	26	15	2
E 313	E1-4 Do you troubleshoot resonant RCL circuits to circuit level components			8	40	19	9	2

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	Task Title								

0156    35d. Calculations    B

E 314	E1-5 Do you calculate values of impedance, voltage, or current in RCL circuits	8	12	14	7	2
E 315	E1-6 Do you calculate phase angle of RCL circuits	5	13	5	6	0
E 316	E1-7 Do you calculate values of power in RCL circuits	5	14	7	7	2

0157    36. Frequency Sensitive Filters (Low Pass, High Pass, Band Pass, Band Reject)

0158    36a. Theory of operation    B

E 317	E2-1 Do you trace schematic or block diagrams of circuits containing frequency sensitive filters	56	59	39	41	6
E 320	E2-4 Do you align or adjust frequency sensitive filters	19	35	25	18	5
E 322	E2-6 Do you perform tasks on low pass frequency sensitive filters	42	58	32	36	7
E 323	E2-7 Do you perform tasks on high pass frequency sensitive filters	42	52	28	28	7
E 324	E2-8 Do you perform tasks on band pass frequency sensitive filters	66	65	42	44	10
E 325	E2-9 Do you perform tasks on band-reject frequency sensitive filters	29	40	25	18	8
E 326	E2-10 Do you perform tasks on ferrite bead frequency sensitive filters	8	18	4	3	2

0159    36b. Isolate faulty frequency sensitive filters    2b

E 318	E2-2 Do you troubleshoot circuits to isolate a faulty frequency sensitive filter	47	57	36	34	10
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0160    36c. Troubleshoot circuits    2b

E 319	E2-3 Do you troubleshoot frequency sensitive filters to circuit level components	20	36	22	15	4
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 455 456 456 493  
 X4 X6 X1A X1B 50

0161 36d. Calculations

E 321 E2-5 Do you calculate capacitance or inductance values for  
 specific frequency sensitive filters 5 19 7 5 1

0162 37. Wave Generating Circuits

0163 37a. Theory of operation

0164 37a(1). Oscillators (LC, RC, Crystal) B

F 327 F1-1 Do you trace block diagrams of circuits containing  
 oscillators 80 66 52 52 7  
 F 328 F1-2 Do you trace schematic diagrams of oscillator circuits 69 65 42 37 4  
 F 331 F1-5 Do you align or adjust oscillator circuits 58 58 35 38 5  
 F 332 F1-6 Do the oscillators you work with use LC tank circuits 20 49 32 17 2  
 F 333 F1-7 Do the oscillators you work with use RC networks 24 52 29 17 3  
 F 334 F1-8 Do the oscillators you work with use crystals 58 61 34 26 6  
 F 335 F1-9 Do the oscillators you work with use phase lock  
 loops (PLL) 78 53 17 10 3  
 F 336 F1-10 Do you perform tasks on series Hartley oscillator  
 circuits 15 40 19 14 2  
 F 337 F1-11 Do you perform tasks on shunt Hartley oscillator  
 circuits 17 31 18 12 1  
 F 338 F1-12 Do you perform tasks on Colpitts oscillator circuits 8 25 17 11 1  
 F 339 F1-13 Do you perform tasks on Clapp oscillator circuits 3 17 4 4 1  
 F 340 F1-14 Do you perform tasks on voltage control oscillators  
 (VCO/VTD) 56 40 34 38 2  
 F 341 F1-15 Do you perform tasks on crystal oscillator circuits 44 51 28 21 4  
 F 342 F1-16 Do you perform tasks on Wien bridge oscillator  
 circuits 3 19 11 7 1  
 F 343 F1-17 Do you perform tasks on pulse generating oscillator  
 circuits 34 24 13 8 2  
 F 344 F1-18 Do you perform tasks on blocked/blocking oscillator  
 circuits 5 16 10 7 0  
 F 345 F1-19 Do you perform tasks on burst generators 3 12 5 3 1  
 F 346 F1-20 Do you perform tasks on RC phase shift oscillators 10 30 17 9 1

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 Y Mbr

Task Title

455 455 456 456 493  
 X4 X6 X1A X1B 50

0165 37a(2). Multivibrators (Astable, Bistable, B Monostable)

F 347	F2-1 Do you trace block diagrams of circuits containing multivibrators	56	45	31	26	1
F 348	F2-2 Do you trace schematic diagrams of multivibrator circuits	41	42	27	19	1
F 351	F2-5 Do you adjust or align multivibrator circuits	8	31	18	11	1
F 352	F2-6 Do the multivibrators you work with use LC tank circuits	10	39	20	14	1
F 353	F2-7 Do the multivibrators you work with use RC networks	17	39	21	16	1
F 354	F2-8 Do the multivibrators you work with use Crystals	24	39	20	17	1
F 355	F2-9 Do you perform tasks on astable (free running) multivibrators	27	37	26	16	2
F 356	F2-10 Do you perform tasks on monostable (one shot) multivibrators	44	35	25	18	1
F 357	F2-11 Do you perform tasks on bistable (flip flop) multivibrators	37	37	27	19	1
F 358	F2-12 Do you perform tasks on triggered astable multivibrators	20	24	21	12	1

0166 37a(3). Waveshaping Circuits (Schmitt Trigger, Sawtooth, RC Integ/Diff) B

F 359	F3-1 Do you trace block diagrams of circuits containing waveshaping circuits (WSC)	36	36	34	38	1
F 360	F3-2 Do you trace schematic diagrams of WSC	25	34	29	31	0
F 363	F3-5 Do you adjust or calibrate WSC	7	27	22	27	1
F 364	F3-6 Do you perform tasks on sawtooth wave generator WSC	22	29	29	34	1
F 365	F3-7 Do you perform tasks on trapezoidal (ramp) wave generator WSC	8	22	22	21	1
F 366	F3-8 Do you perform tasks on RC differentiating WSC	10	19	12	11	0
F 367	F3-9 Do you perform tasks on RL differentiating WSC	8	19	10	8	0
F 368	F3-10 Do you perform tasks on RC integrating WSC	14	18	10	9	0
F 369	F3-11 Do you perform tasks on RL integrating WSC	8	20	9	8	0
F 370	F3-12 Do you perform tasks on square wave generator WSC	31	30	32	28	5
F 371	F3-13 Do you perform tasks on rectangular wave generator WSC	12	23	24	21	2
F 372	F3-14 Do you perform tasks on Schmitt trigger WSC	17	31	16	16	0

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 Y Nbr Task Title 455 455 456 456 493  
 X4 X6 X1A X1B 50

0167 37b. Isolate faulty wave generating circuits 2b

F 329 F1-3 Do you troubleshoot to isolate a faulty oscillator circuit 78 60 42 45 7  
 F 349 F2-3 Do you troubleshoot to isolate a faulty multivibrator circuit 32 41 25 21 1  
 F 361 F3-3 Do you troubleshoot to isolate a faulty WSC 25 33 26 36 2

0168 37c. Troubleshoot circuits 2b

F 330 F1-4 Do you troubleshoot oscillators to circuit level components 27 55 26 20 3  
 F 350 F2-4 Do you troubleshoot multivibrators to circuit level components 12 39 22 13 1  
 F 362 F3-4 Do you troubleshoot WSC to circuit level components 8 25 18 17 0

0169 38. Limiter Circuits (Diode, Zener Diode, Transistor)

0170 38a. Theory of operation B

F 373 F4-1 Do you trace block diagrams of circuits containing limiters 36 37 25 17 2  
 F 374 F4-2 Do you trace schematic diagrams of limiter circuits 24 37 21 15 2  
 F 381 F4-9 Do you perform tasks on series diode limiter circuits 19 34 14 11 1  
 F 382 F4-10 Do you perform tasks on shunt diode limiter circuits 17 33 19 11 1  
 F 383 F4-11 Do you perform tasks on bias limiter circuits 5 24 12 8 1  
 F 384 F4-12 Do you perform tasks on zener diode circuits 29 36 19 12 2  
 F 385 F4-13 Do you perform tasks on transistor limiter circuits 15 31 15 10 1  
 F 386 F4-14 Do you perform tasks on triode limiter circuits 5 18 6 4 0

0171 38b. Isolate faulty limiters 2b

F 377 F4-5 Do you troubleshoot to isolate a faulty limiter circuit 24 34 21 9 2

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 T Tsk  
 Y Nbr  
 Task Title  
 455 456 456 456 493  
 X4 X6 X1A X1B 50

0172 38c. Troubleshoot circuits 2b

F 378 F4-6 Do you troubleshoot limiters to circuit level components 10 31 15 8 1

0173 39. Clamper Circuits

0174 39a. Theory of operation B

F 375 F4-3 Do you trace block diagrams of circuits containing clampers 20 27 19 13 1  
 F 376 F4-4 Do you trace schematic diagrams of clamper circuits 15 24 18 13 1  
 F 387 F4-15 Do you perform tasks on diode clamper circuits 10 23 14 8 1  
 F 388 F4-16 Do you perform tasks on bias clamper circuits 5 19 11 7 1

0175 39b. Isolate faulty clampers 2b

F 379 F4-7 Do you troubleshoot to isolate a faulty clamper circuit 17 27 14 9 2

0176 39c. Troubleshoot circuits 2b

F 380 F4-8 Do you troubleshoot clampers to circuit level components 8 25 14 7 1

0177 40. Digital Numbering Systems (Binary, Octal, Hexadecimal)

0178 40a. Conversions B

G 389 G1-1 Do you convert decimal numbers to binary numbers or binary numbers to decimal 85 37 44 36 15  
 G 390 G1-2 Do you convert octal numbers to binary or binary numbers to octal 95 36 40 25 8



D	T Isk	Y Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
G 391			G1-3 Do you convert hexadecimal numbers to binary or binary numbers to hexadecimal	61	31	29	22	9
G 392			G1-4 Do you convert octal numbers to decimal or decimal numbers to octal	88	34	39	25	9
G 393			G1-5 Do you convert hexadecimal numbers to decimal or decimal numbers to hexadecimal	59	31	27	21	8
G 394			G1-6 Do you convert octal numbers to hexadecimal or hexadecimal numbers to octal	56	30	25	20	6
G 395			G1-7 Do you convert base number fractions to another base numbering system	34	27	15	12	7

0179 40b. Math operations B

G 396			G1-8 Do you add binary numbers	80	28	33	22	10
G 397			G1-9 Do you subtract binary numbers	75	28	18	9	
G 398			G1-10 Do you multiply binary numbers	36	22	16	13	6
G 399			G1-11 Do you divide binary numbers	36	20	15	13	6
G 400			G1-12 Do you add octal numbers	83	24	23	15	6
G 401			G1-13 Do you subtract octal numbers	81	22	20	16	5
G 402			G1-14 Do you add hexadecimal numbers	44	24	16	17	4
G 403			G1-15 Do you subtract hexadecimal numbers	44	27	15	15	4

0180 40c. Binary Code Systems B

G 404			G1-16 Do you use binary coded decimal (BCD)	59	35	33	25	10
G 405			G1-17 Do you use gray codes	24	10	12	10	6
G 406			G1-18 Do you use ICAO codes	2	5	4	2	2
G 407			G1-19 Do you use excess-3 (XS3) codes	2	12	7	6	3
G 408			G1-20 Do you use parity bit codes	37	25	17	15	19
G 409			G1-21 Do you use binary codes	3	7	4	1	4
G 410			G1-22 Do you use ASCII codes	39	34	25	14	34
G 411			G1-23 Do you use EBCDI codes	2	10	3	2	7

0181 41. Digital Logic Functions (Main Logic Gates and Flip-flops)

0182 41a. Theory of operation B

G 412			G1-24 Do you trace data flow through logic symbol diagrams	86	46	52	44	9
G 413			G1-25 Do you trace data flow through logic schematic diagrams	85	45	51	38	7

D T Y	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
G 417	G1-29 Do you trace data flow through circuits using positive logic (High = Binary 1)	83	35	47	38	8
G 418	G1-30 Do you trace data flow through circuits using negative logic (High = Binary 0)	76	33	38	30	7
G 419	G1-31 Do you perform tasks related to AND gates	90	45	49	41	5
G 420	G1-32 Do you perform tasks related to OR gates	90	43	49	42	5
G 421	G1-33 Do you perform tasks related to inhibited gates logic functions	42	35	35	32	3
G 422	G1-34 Do you perform tasks related to NAND or NOR gates	92	43	45	39	4
G 423	G1-35 Do you perform tasks related to exclusive OR/NOR logic functions	90	36	38	33	4
G 424	G1-36 Do you perform tasks related to RS flip flops	56	30	24	17	3
G 425	G1-37 Do you perform tasks related to D(Data) flip flops	56	34	27	18	3
G 426	G1-38 Do you perform tasks related to T(Toggle) flip flops	56	31	19	13	3
G 427	G1-39 Do you perform tasks related to JK flip flops	83	36	28	13	2
G 428	G1-40 Do you perform tasks related to Schmidt triggers	29	33	18	16	3
G 429	G1-41 Do you perform tasks related to delay (One-shot) logic functions	58	29	23	13	3
G 430	G1-42 Do you perform tasks related to open collector gates (wired "AND" or wired "OR")	34	23	19	13	3
G 431	G1-43 Do you perform tasks related to buffers	63	31	27	19	8
G 432	G1-44 Do you perform tasks related to inverters	81	41	40	27	5
G 433	G1-45 Do you perform tasks related to complemented flip flops	42	31	18	12	3
G 434	G1-46 Do you perform tasks related to complementing flip flops	44	28	19	12	3
0183	41b. Isolate faulty logic function circuits	2b				
G 414	G1-26 Do you troubleshoot digital systems to major units	90	53	51	36	33
G 415	G1-27 Do you troubleshoot digital systems subassemblies or circuit cards	85	45	52	36	15
0184	41c. Troubleshoot circuits	2b				
G 416	G1-28 Do you troubleshoot digital systems, subsystems or circuit cards to circuit level components or IC	56	43	40	16	9
0185	41d. Logic families (TTL and CMOS)	B				
G 438	G1-50 Do you perform tasks on RTL (resistor transistor logic formally DCTL)	19	20	10	6	2
G 439	G1-51 Do you perform tasks on DTL (diode transistor logic)	22	18	12	5	2

D	T Task	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
G 440	G1-52	Do you perform tasks on TTL (transistor transistor logic)	75	25	27	18	3
G 441	G1-53	Do you perform tasks on ECL/CHL (emitter coupled or current mode logic)	47	12	8	4	2
G 442	G1-54	Do you perform tasks on HTL (high threshold logic)	8	13	7	3	2
G 443	G1-55	Do you perform tasks on CMOS (complementary metal oxide semiconductor)	25	24	15	6	2
G 444	G1-56	Do you perform tasks on positive MOS ICs	7	14	7	4	2
G 445	G1-57	Do you perform tasks on negative MOS ICs	10	13	7	4	2
G 446	G1-58	Do you perform tasks on vertical MOS ICs	8	13	4	2	2
0186	42.	Boolean Equations					
0187	42a.	Diagram to equation					
G 435	G1-47	Do you develop Boolean equations from logic circuits or diagrams	27	18	12	12	2
0188	42b.	Equation to diagram					
G 436	G1-48	Do you develop logic diagrams from Boolean equations	19	19	12	10	2
0189	42c.	Simplify Expressions					
G 437	G1-49	Do you simplify Boolean expressions using Boolean algebra	15	18	11	9	2
0190	43.	Computers					
0191	43a.	Operation principles					
G 447	G2-1	Do you trace block or schematic diagrams of computer controlled or computer based systems	69	37	44	47	9
G 454	G2-8	Do you perform tasks on analog computers	51	18	24	24	14
G 455	G2-9	Do you perform tasks on digital computers	78	31	49	49	27

D	T Task	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
0192	43b.	Load programs					
		2b					
G 448	G2-2	Do you load programs	78	29	49	62	26
0193	43c.	Write/debug programs					
		2b					
G 449	G2-3	Do you write or debug programs	42	4	7	10	9
G 453	G2-7	Do you use computer flow charts or diagrams	63	20	30	32	8
0194	43d.	Fault isolation					
		2b					
G 450	G2-4	Do you troubleshoot computers to a major unit	61	30	38	41	17
G 451	G2-5	Do you troubleshoot computers to a subassembly or circuit card	61	22	37	30	6
0195	43e.	Circuit troubleshooting					
		2b					
G 452	G2-6	Do you troubleshoot computer subassembly or circuit card to circuit level components or IC	22	12	19	11	3
0196	43f.	Types of memories					
		B					
G 466	G2-20	Do you perform tasks on magnetic (tape, disc, core) computer memories	73	31	43	57	21
G 467	G2-21	Do you perform tasks on semiconductor (RAM, ROM, EPROM, PROM) computer memories	73	19	45	43	8
G 468	G2-22	Do you perform tasks on paper (tape, punch card) computer memories	63	8	36	37	5
G 469	G2-23	Do you perform tasks on advanced technology (bubble, CCD, electron beam, laser, thin film) computer memories	7	5	9	20	2
0197	43g.	Peripheral devices					
		B					
G 470	G2-24	Do you perform tasks on computer keyboards	73	31	44	53	43
G 471	G2-25	Do you perform tasks on computer character printers	36	31	27	22	24
G 472	G2-26	Do you perform tasks on magnetic tape drives	49	24	34	34	9

D	T Tsk	Y Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
G 473	G2-27	Do you perform tasks on microprocessor computer terminals	19	10	23	18	19	
G 474	G2-28	Do you perform tasks on video display unit (VDU/monitors)	31	8	33	33	22	
G 475	G2-29	Do you perform tasks on paper tape readers/punches	58	5	35	39	7	
G 476	G2-30	Do you perform tasks on paper card readers/punches	12	2	6	9	4	
G 477	G2-31	Do you perform tasks on toggle or push button switch inputs	46	8	31	35	6	
G 478	G2-32	Do you perform tasks on incandescent displays (Nixie tubes, LEDs, LCDs)	39	20	25	29	5	
G 479	G2-33	Do you perform tasks on modems	3	29	14	7	46	
G 480	G2-34	Do you perform tasks on line printers	47	20	25	17	28	
G 481	G2-35	Do you perform tasks on floppy disc drives	3	1	19	33	29	
G 482	G2-36	Do you perform tasks on removable cartridge disc drives	2	4	22	21	11	
G 483	G2-37	Do you perform tasks on removable pack disc drives	2	1	15	11	4	
G 484	G2-38	Do you perform tasks on fixed Winchester type disc drives	2	2	11	10	12	

0198 43h. Programming languages

G 456	G2-10	Do you use Basic computer language	20	7	20	19	20	
G 457	G2-11	Do you use COBOL computer language	2	0	3	4	2	
G 458	G2-12	Do you use FORTRAN computer language	2	0	14	7	1	
G 459	G2-13	Do you use ADA computer language	3	1	2	4	1	
G 460	G2-14	Do you use ATLAS computer language	0	0	3	4	1	
G 461	G2-15	Do you use ELAN computer language	0	1	2	2	1	
G 462	G2-16	Do you use PASCAL computer language	0	0	3	6	2	
G 463	G2-17	Do you use RPG computer language	2	0	2	3	1	
G 464	G2-18	Do you use Machine computer language	39	2	13	10	5	
G 465	G2-19	Do you use C computer language	2	1	4	2	2	

0199 44. Microprocessor Controlled Systems

0200 44a. Theory of operation B

G 485 G2-39 Do you trace block or schematic diagrams of microprocessor controlled systems

39 22 32 25 3

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 Y Nbr Task Title 455 456 456 456 493  
 X4 X6 X1A X1B 50

0201 44b. Isolate faulty microprocessors 2b

G 486 G2-40 Do you troubleshoot microprocessor controlled systems to a subassembly or circuit card 37 16 27 20 3  
 G 487 G2-41 Do you troubleshoot microprocessor controlled systems to isolate a faulty microprocessor 25 19 18 11 4

0202 45. Logic Circuits

0203 45a. Theory of operation

0204 45a(1). Counters (Synchronous/ Asynchronous-Up/Down counters) B

G 488 G3-1 Do you trace data flow through circuits containing counters 71 29 35 18 3  
 G 491 G3-4 Do you perform tasks on UP counters in logic circuits 69 33 35 15 1  
 G 492 G3-5 Do you perform tasks on DOWN counters in logic circuits 66 28 28 13 0  
 G 493 G3-6 Do you perform tasks on DECADE counters in logic circuits 15 18 21 11 2  
 G 494 G3-7 Do you perform tasks on ring counters in logic circuits 17 8 20 10 0  
 G 495 G3-8 Do you perform tasks on modulus counters in logic circuits 22 14 9 3 0  
 G 496 G3-9 Do you perform tasks on synchronous (parallel) counters in logic circuits 44 25 25 9 2  
 G 497 G3-10 Do you perform tasks on asynchronous (serial) counters in logic circuits 46 27 27 9 3

0205 45a(2). Registers (Shift and Storage) B

G 498 G3-11 Do you trace logic diagrams of circuits containing registers 75 30 32 14 1  
 G 501 G3-14 Do you perform tasks on shift registers in logic circuits 73 29 32 15 1

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Task Title

	455 X4	455 X6	456 X1A	456 X1B	493 50
G 502 G3-15 Do you perform tasks on storage registers in logic circuits	71	30	31	15	1

0206 45a(3). Combinational Logic Circuits B  
(Half-adder, Full-adder, encoder,  
Decoder, Multiplexer, Demultiplexer,  
Count Detect)

	46	28	31	20	2
G 503 G3-16 Do you trace data flow through combinational logic circuits	46	28	31	20	2
G 506 G3-19 Do you perform tasks on encoders	49	30	35	23	5
G 507 G3-20 Do you perform tasks on decoders	49	31	35	21	5
G 508 G3-21 Do you perform tasks on multiplexers	64	40	30	14	21
G 509 G3-22 Do you perform tasks on demultiplexers	17	37	21	8	19
G 510 G3-23 Do you perform tasks on comparators	53	24	20	9	2
G 511 G3-24 Do you perform tasks on parity generators or checkers	46	22	20	8	3
G 512 G3-25 Do you perform tasks on code converters	17	18	12	6	3
G 513 G3-26 Do you perform tasks on adders	42	22	14	7	0
G 514 G3-27 Do you perform tasks on subtractors	42	18	14	5	0
G 515 G3-28 Do you perform tasks on count detect circuits	24	16	10	6	0

0207 45b. Isolate faulty circuits 2b

	59	31	30	15	2
G 489 G3-2 Do you troubleshoot counter circuits to isolate a faulty counter	59	31	30	15	2
G 499 G3-12 Do you troubleshoot circuits containing registers to isolate a faulty register	64	33	25	11	1
G 504 G3-17 Do you troubleshoot to isolate a faulty combinational logic circuit	41	27	26	16	2

0208 45c. Troubleshoot circuits

	36	28	23	7	2
G 490 G3-3 Do you troubleshoot counters to circuit level components	36	28	23	7	2
G 500 G3-13 Do you troubleshoot registers to circuit level components	34	22	22	6	0
G 505 G3-18 Do you troubleshoot combinational logic circuits to circuit level components	20	23	20	7	1

D	T	Task Title	455	456	456	456	493
Y	Nbr		X4	X6	X1A	X1B	50

0209 46. D/A, A/D Converters (Approx D/A and Ramp A/D)

0210 46a. Theory of operation B

G 516	G4-1	Do you trace data flow through A/D converters	86	28	37	23	25
G 517	G4-2	Do you trace data flow through D/A converters	85	24	36	22	26
G 520	G4-5	Do the converters you perform tasks on use flash conversion	5	2	4	1	1
G 521	G4-6	Do the converters you perform tasks on use successive approximation conversion	24	6	9	1	1
G 522	G4-7	Do the converters you perform tasks on use ramp conversion	15	5	12	2	1
G 523	G4-8	Do the converters you perform tasks on use R2R conversion	7	4	2	3	1

0211 46b. Isolate faulty converters 2b

G 518	G4-3	Do you troubleshoot A/D converter circuits	75	27	30	15	26
G 519	G4-4	Do you troubleshoot D/A converter circuits	76	23	31	16	27

0212 47. Transmission Lines

0213 47a. Theory of operation B

H 527	H1-4	Do you construct transmission lines	22	31	25	13	14
H 528	H1-5	Do you match transmission line impedance with loads	39	31	21	14	22
H 531	H1-8	Do you perform tasks on open-wire transmission lines	15	16	17	8	16
H 532	H1-9	Do you perform tasks on twisted pair transmission lines	36	20	33	15	47
H 533	H1-10	Do you perform tasks on twin lead transmission lines	12	17	12	5	11
H 534	H1-11	Do you perform tasks on flexible coaxial transmission lines	75	48	54	51	29
H 535	H1-12	Do you perform tasks on rigid coaxial transmission lines	76	33	35	31	9
H 536	H1-13	Do you perform tasks on fiber-optic transmission lines	32	6	6	3	14



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Task Title

455 455 456 456 493  
X4 X6 X1A X1B 50

0214 47b. Perform Measurements 2b

H 524 H1-1 Do you measure electrical length on transmission lines 41 16 15 14 9  
H 525 H1-2 Do you measure physical length on transmission lines 36 29 19 15 9  
H 526 H1-3 Do you measure standing wave ratio (SWR) on trans-  
mission lines 69 45 28 29 8

0215 47c. Calculations

H 529 H1-6 Do you calculate the characteristic impedance (Z0)  
of transmission lines 22 17 8 7 16

0216 47d. Isolate faulty transmission lines

H 530 H1-7 Do you troubleshoot transmission lines 54 48 35 33 52

0217 48. Waveguides

0218 48a. Theory of operation B

H 537 H1-14 Do you trace schematic or block diagrams of circuits 86 11 45 42 2  
containing waveguides  
H 539 H1-16 Do you pressurize or purge waveguide assemblies 92 8 31 6 1  
H 540 H1-17 Do you measure standing wave ratio for waveguide 78 5 24 22 1  
assemblies  
H 541 H1-18 Do you remove or install waveguide or associated 90 10 51 45 3  
coupling hardware components

0219 48b. Isolate faulty waveguides 2b

H 538 H1-15 Do you troubleshoot circuits to isolate a faulty 88 10 43 40 2  
waveguide assembly

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 Y Nbr Task Title 455 455 456 456 493  
 X4 X6 X1A X1B 50

0220 49. Microwave Oscillators & Amplifiers

0221 49a. Theory of operation B

H 542	H2-1 Do you trace schematic or block diagrams of circuits containing microwave oscillators or amplifiers	76	4	32	37	2
H 545	H2-4 Do you perform tasks on two-cavity klystron microwave oscillators and amplifiers	37	1	4	2	0
H 546	H2-5 Do you perform tasks on three-cavity klystron microwave oscillators and amplifiers	53	0	3	1	0
H 547	H2-6 Do you perform tasks on reflex klystron microwave oscillators and amplifiers	14	0	4	2	0
H 548	H2-7 Do you perform tasks on traveling wave tube microwave oscillators and amplifiers	69	0	29	35	1
H 549	H2-8 Do you perform tasks on magnetron microwave oscillators and amplifiers	12	0	14	7	0
H 550	H2-9 Do you perform tasks on backward wave oscillator	3	0	16	4	0
H 551	H2-10 Do you perform tasks on parametric amplifiers	44	1	6	1	0
H 552	H2-11 Do you perform tasks on yttrium iron garnet (YIG) tuned microwave oscillators and amplifiers	0	2	23	10	0

0222 49b. Tune or Adjust 2b

H 544	H2-3 Do you tune or adjust microwave oscillators or amplifiers	63	4	27	27	2
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0223 49c. Isolate faulty microwave oscillators 2b or amplifiers

H 543	H2-2 Do you troubleshoot circuits to isolate a faulty microwave oscillator or amplifier	73	4	31	32	3
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0224 50. Resonant Cavities

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455 455 456 456 493  
X4 X6 X1A X1B 50

0225 50a. Theory of operation B

H 553 H3-1 Do you trace schematic or block diagrams of circuits containing resonant cavities 34 49 12 8 1  
H 558 H3-6 Do you perform tasks on probe resonant cavities 7 14 5 3 0  
H 559 H3-7 Do you perform tasks on loop resonant cavities 10 18 4 2 0  
H 560 H3-8 Do you perform tasks on aperture (iris/window) resonant cavities 8 10 6 0 0

0226 50b. Isolate faulty resonant cavities 2b

H 554 H3-2 Do you troubleshoot circuits to isolate a faulty resonant cavity 27 48 10 6 1  
H 557 H3-5 Do you measure frequency of resonant cavities 15 35 8 7 1

0227 50c. Tune/adjust 2b

H 555 H3-3 Do you tune or adjust resonant cavities electrically 27 48 7 5 0  
H 556 H3-4 Do you tune or adjust resonant cavities physically 3 47 6 3 1

0228 51. Transmitters

0229 51a. Theory of operation

0230 51a(1). Amplitude Modulation

H 561 H4-1 Do you use "AM" modulation principles 12 80 35 34 15  
H 562 H4-2 Do you trace block diagrams of AM transmitters 10 87 34 30 3  
H 563 H4-3 Do you trace block diagrams of AM transmitter subassemblies or circuit cards 8 75 27 28 2  
H 564 H4-4 Do you trace schematic diagrams of AM transmitter subassemblies or circuit cards 8 67 25 23 1  
H 568 H4-8 Do you align or adjust AM transmitters or circuits 5 88 26 23 3  
H 569 H4-9 Do you calculate percentage of modulation for AM transmitters 3 53 12 12 3

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 X4 X6 X1A X1B 50

0231 51a(2). Frequency Modulation

H 593 H4-33 Do you use "FM" modulation principles 24 90 41 34 21  
 H 594 H4-34 Do you trace block diagrams of FM transmitters 22 93 37 32 6  
 H 595 H4-35 Do you trace block diagrams of FM transmitter subassemblies or circuit cards 22 78 31 30 3  
 H 596 H4-36 Do you trace schematic diagrams of FM transmitter subassemblies or circuit cards 19 75 27 27 2  
 H 600 H4-40 Do you align or adjust FM transmitters or circuits 15 87 28 25 7  
 H 601 H4-41 Do you calculate modulation index for FM transmitters 7 41 9 8 2  
 H 602 H4-42 Do you measure frequency deviation for FM transmitters 17 78 20 25 13

0232 51a(3). Single Side Band

H 578 H4-18 Do you trace block diagrams of single side band (SSB) transmitters 7 29 3 5 3  
 H 579 H4-19 Do you trace block diagrams of SSB transmitter subassemblies or circuit cards 5 24 3 3 0  
 H 580 H4-20 Do you trace schematic diagrams of SSB transmitter subassemblies or circuit cards 5 19 4 3 0  
 H 584 H4-24 Do you align or adjust SSB transmitters or circuits 2 19 4 4 4  
 H 585 H4-25 Do you calculate percentage of modulation for SSB transmitters 2 12 3 3 1

0233 51a(4). Pulse Modulation

H 612 H4-52 Do you use "PM" modulation principles 46 6 31 24 12  
 H 613 H4-53 Do you trace block diagrams of PM transmitters 59 5 28 23 2  
 H 614 H4-54 Do you trace block diagrams of PM transmitter subassemblies or circuit cards 58 5 23 21 0  
 H 615 H4-55 Do you trace schematic diagrams of PM transmitter subassemblies or circuit cards 53 5 21 20 0  
 H 619 H4-59 Do you align or adjust PM transmitters or circuits 46 4 19 20 3  
 H 620 H4-60 Do you calculate pulse recurrence time (PRT) or pulse recurrence frequency (PRF) for PM transmitters 56 5 15 19 1  
 H 621 H4-61 Do you measure PRT, PRF or pulse width for PM transmitters 61 5 19 23 1

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455 455 456 456 493  
X4 X6 X1A X1B 50

0234 51b. Isolate faulty transmitters

H 565	H4-5 Do you troubleshoot AM transmitters to major units	8	90	27	26	3
H 566	H4-6 Do you troubleshoot AM transmitters to subassemblies or circuit cards	8	69	26	24	1
H 581	H4-21 Do you troubleshoot SSB transmitters to major units	5	29	4	4	5
H 582	H4-22 Do you troubleshoot SSB transmitters to subassemblies or circuit cards	5	18	4	3	1
H 597	H4-37 Do you troubleshoot FM transmitters to major units	19	90	31	30	13
H 598	H4-38 Do you troubleshoot FM transmitters to subassemblies or circuit cards	17	70	29	26	5
H 616	H4-56 Do you troubleshoot PM transmitters to major units	58	4	23	20	3
H 617	H4-57 Do you troubleshoot PM transmitters to subassemblies or circuit cards	56	4	21	20	1

0235 51c. Troubleshoot circuits

H 567	H4-7 Do you troubleshoot AM transmitter subassemblies or circuit cards to circuit level components	7	59	19	13	1
H 583	H4-23 Do you troubleshoot SSB transmitter subassemblies or circuit cards to circuit level components	5	17	4	3	2
H 599	H4-39 Do you troubleshoot FM transmitter subassemblies or circuit cards to circuit level components	10	59	20	14	3
H 618	H4-58 Do you troubleshoot PM transmitter subassemblies or circuit cards to circuit level components	27	4	13	7	1

0236 52. Receivers

0237 52a. Theory of operation

0238 52a(1). Amplitude Modulation

H 570	H4-10 Do you use "AM" demodulation principles	7	78	30	14	12
H 571	H4-11 Do you trace block diagrams of AM receivers	7	86	35	18	2
H 572	H4-12 Do you trace block diagrams of AM receiver subassemblies or circuit cards	7	72	29	12	1

D	T	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
H 573		H4-13 Do you trace schematic diagrams of AM receiver subassemblies or circuit cards	7	67	27	11	0
H 577		H4-17 Do you align or adjust AM receivers or circuits	5	81	24	9	1

0239 52a(2). Frequency Modulation

H 603		H4-43 Do you use "FM" demodulation principles	12	86	35	20	18
H 604		H4-44 Do you trace block diagrams of FM receivers	17	89	44	23	6
H 605		H4-45 Do you trace block diagrams of FM receiver subassemblies or circuit cards	17	77	38	18	3
H 606		H4-46 Do you trace schematic diagrams of FM receiver subassemblies or circuit cards	14	72	33	17	2
H 610		H4-50 Do you align or adjust FM receivers or circuits	8	89	28	14	8
H 611		H4-51 Do you plot receiver signal level curves (RSL) for FM receivers	5	29	10	4	10

0240 52a(3). Single Side Band

H 586		H4-26 Do you trace block diagrams of SSB receivers	5	28	8	8	2
H 587		H4-27 Do you trace block diagrams of SSB receiver subassemblies or circuit cards	3	23	7	5	0
H 588		H4-28 Do you trace schematic diagrams of SSB receiver subassemblies or circuit cards	3	18	6	4	0
H 592		H4-32 Do you align or adjust SSB receivers or circuits	3	19	5	4	3

0241 52a(4). Pulse Modulation

H 622		H4-62 Do you use "PM" demodulation principles	39	4	25	17	9
H 623		H4-63 Do you trace block diagrams of PM receivers	53	4	27	21	1
H 624		H4-64 Do you trace block diagrams of PM receiver subassemblies or circuit cards	51	4	19	18	0
H 625		H4-65 Do you trace schematic diagrams of PM receiver subassemblies or circuit cards	46	4	19	13	0
H 629		H4-69 Do you align or adjust PM receivers or circuits	44	4	19	13	2

0242 52b. Isolate faulty receivers

H 574		H4-14 Do you troubleshoot AM receivers to major units	7	86	31	15	5
H 575		H4-15 Do you troubleshoot AM receivers to subassemblies or circuit cards	7	63	27	10	1
H 589		H4-29 Do you troubleshoot SSB receivers to major units	3	28	6	5	4

D	T	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
H	590	H4-30 Do you troubleshoot SSB receivers to sub-assemblies or circuit cards	3	17	4	4	1
H	607	H4-47 Do you troubleshoot FM receivers to major units	14	90	37	20	12
H	608	H4-48 Do you troubleshoot FM receivers to subassemblies or circuit cards	14	70	34	16	5
H	626	H4-66 Do you troubleshoot PM receivers to major units	51	4	21	16	3
H	627	H4-67 Do you troubleshoot PM receivers to subassemblies or circuit cards	47	4	18	14	0

#### 0243 52c. Troubleshoot circuits

H	576	H4-16 Do you troubleshoot AM receiver subassemblies or circuit cards to circuit level components	2	53	17	7	0
H	591	H4-31 Do you troubleshoot SSB receiver subassemblies or circuit cards to circuit level components	3	16	5	4	2
H	609	H4-49 Do you troubleshoot FM receiver subassemblies or circuit cards to circuit level components	5	57	21	10	3
H	628	H4-68 Do you troubleshoot PM receiver subassemblies or circuit cards to circuit level components	24	4	9	6	1

#### 0244 53. Transmission Power

#### 0245 53a. Perform measurements

I	660	I1-1 Do you measure RF power	92	93	57	65	10
I	661	I1-2 Do you measure RF peak power	88	55	43	49	5
I	662	I1-3 Do you measure RF average power	95	48	36	40	5
I	663	I1-4 Do you measure RF effective power	46	40	24	24	5
I	664	I1-5 Do you measure RF output power using wattmeters	83	84	39	36	5

#### 0246 53b. Calculations

I	665	I2-1 Do you calculate RF apparent power	22	19	14	15	2
I	666	I2-2 Do you calculate RF true power	25	19	19	14	2
I	667	I2-3 Do you calculate RF power loss or gain in db	86	42	50	50	6

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 455 456 456 493  
 X4 X6 X1A X1B 50

0247 54. Antennas

0248 54a. Theory of operation

H 634	H5-5 Do you plot graph radiation patterns	12	0	4	1	1
H 637	H5-8 Do you work with Yagi antennas	3	6	0	2	2
H 638	H5-9 Do you work with dipole antennas	53	58	27	20	6
H 639	H5-10 Do you work with slotted antennas	44	5	13	5	0
H 640	H5-11 Do you work with rotary antennas	31	1	9	6	3
H 641	H5-12 Do you work with hertz antennas	2	4	1	0	0
H 642	H5-13 Do you work with marconi antennas	0	4	2	1	1
H 643	H5-14 Do you work with rhombic antennas	0	5	4	1	4
H 644	H5-15 Do you work with scimitar antennas	0	1	28	6	0
H 645	H5-16 Do you work with parabolic antennas	7	19	12	14	7
H 646	H5-17 Do you work with ground plane antennas	3	23	11	7	5
H 647	H5-18 Do you perform tasks on rotary antenna arrays	31	1	6	2	1
H 648	H5-19 Do you perform tasks on stacked (end fire) antenna arrays	10	1	4	2	0
H 649	H5-20 Do you perform tasks on broadside antenna arrays	5	1	3	0	1
H 650	H5-21 Do you perform tasks on cardioid antenna arrays	3	2	3	1	0
H 651	H5-22 Do you perform tasks on collinear antenna arrays	0	4	2	3	0
H 652	H5-23 Do you perform tasks on phase antenna arrays	73	6	9	15	0
H 653	H5-24 Do you perform tasks on planar antenna arrays	8	5	3	2	1
H 654	H5-25 Do you perform tasks on antennas with vertical polarization	53	23	27	30	6
H 655	H5-26 Do you perform tasks on antennas with horizontal polarization	53	24	24	23	6
H 656	H5-27 Do you perform tasks on antennas with circular polarization	27	22	23	36	1
H 657	H5-28 Do you perform tasks on antennas with unidirectional radiation patterns	47	34	26	33	8
H 658	H5-29 Do you perform tasks on antennas with bidirectional radiation patterns	19	37	18	13	6
H 659	H5-30 Do you perform tasks on antennas with omnidirectional radiation patterns	41	65	30	41	7

0249 54b. Perform alignments

H 630	H5-1 Do you physically align antennas	12	16	13	15	5
H 631	H5-2 Do you electrically align antennas	36	17	10	7	4
H 636	H5-7 Do you measure standing wave ratio (SWR) for antennas	61	58	25	22	2



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Task Title

455 455 456 456 493  
X4 X6 X1A X1B 50

0250 54c. Isolate faulty antennas

H 632 H5-3 Do you troubleshoot loading of antennas 27 41 15 16 3  
H 633 H5-4 Do you troubleshoot coupling of antennas 39 41 24 26 3  
H 635 H5-6 Do you troubleshoot antenna components 61 47 22 24 2

0251 55. Microphones

0252 55a. Theory of operation

J 668 J1-1 Do you trace block diagrams of circuits containing microphones 2 60 13 5 2  
J 669 J1-2 Do you trace schematic diagrams of microphone circuits 0 52 11 2 1  
J 672 J1-5 Do you work on carbon microphones 2 41 3 2 3  
J 673 J1-6 Do you work on capacitor microphones 2 8 0 2 0  
J 674 J1-7 Do you work on crystal microphones 2 12 1 0 1  
J 675 J1-8 Do you work on dynamic microphones 2 45 6 0 3  
J 676 J1-9 Do you work on velocity ribbon microphones 0 5 1 0 0

0253 55b. Isolate faulty microphones

J 670 J1-3 Do you troubleshoot to isolate a faulty microphone 0 61 15 3 3

0254 55c. Troubleshoot circuits

J 671 J1-4 Do you troubleshoot microphones 0 43 3 1 1

0255 56. Speakers

0256 56a. Theory of operation

J 677 J1-10 Do you trace block diagrams of circuits containing speakers 0 61 12 9 3

D	T	Task	Task Title	455	455	456	456	493
Y	Nbr			X4	X6	X1A	X1B	50
J 678	J1-11	Do you trace schematic diagrams of speaker circuits		0	51	11	6	2

0257 56b. Isolate faulty speakers

J 679 J1-12 Do you troubleshoot to isolate a faulty speaker 0 64 14 7 8

0258 56c. Troubleshoot circuits

J 680 J1-13 Do you troubleshoot speakers 0 43 3 2 6

0259 57. Photosensitive Devices

0260 57a. Theory of operation B

J 681	J2-1	Do you trace block diagrams of circuits containing photosensitive devices	17	11	8	7	0
J 682	J2-2	Do you trace schematic diagrams of photosensitive device circuits	8	11	9	6	0
J 684	J2-4	Do you adjust or calibrate photosensitive devices	2	5	8	4	0
J 685	J2-5	Do you work on photodiodes	5	8	4	4	0
J 686	J2-6	Do you work on phototransistors	5	8	4	3	0
J 687	J2-7	Do you work on phototubes	0	0	2	1	0
J 688	J2-8	Do you work on photo-SCMs	0	0	2	1	0
J 689	J2-9	Do you work on photocells (Photoconductive or Photovoltaic)	8	5	4	4	0

0261 57b. Isolate faulty photosensitive devices 2b

J 683 J2-3 Do you troubleshoot to isolate a faulty photosensitive device 14 11 9 6 0

0262 58. Display Tubes

D T Task Y Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
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0263 58a. Theory of operation

J 690	J3-1 Do you trace block diagrams of circuits containing display tubes	5	4	6	2	0
J 691	J3-2 Do you trace schematic diagrams of display tubes or circuits	5	2	6	0	0
J 693	J3-4 Do you adjust or calibrate display tubes or circuits	0	10	4	0	0
J 694	J3-5 Do you work on direct view storage tubes (DVST)	0	5	6	1	0
J 695	J3-6 Do you work on multiple mode storage tubes (MMST)	2	0	4	0	0
J 696	J3-7 Do you work on scan converter tubes (SCT)	0	0	3	0	0

0264 58b. Isolate faulty display tubes

J 692	J3-3 Do you troubleshoot to isolate a faulty display tube	3	6	5	0	0
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0265 59. Support Subjects

0266 59a. Safety applicable to electronics B

0267 59b. First aid for electrical shock B

0268 59c. Electrostatic Discharge (ESD) Control B

0269 Tasks not referenced

B 175	B3-4 Do you use audio sine-wave signal generators	8	83	29	14	48
B 176	B3-5 Do you use audio non-sinusoidal signal generators	2	34	12	7	15
B 177	B3-6 Do you use RF less than 1,000MH signal generators	37	72	46	33	18
B 178	B3-7 Do you use RF greater than 1,000MH signal generators	51	31	59	59	10
B 179	B3-8 Do you use white noise signal generators	7	25	6	14	15
B 180	B3-9 Do you use pattern signal generators	3	20	11	7	53

D T Y	Task Title	455 X4	455 X6	456 X1A	456 X1B	493 50
B 181	B3-10 Do you use pseudo-random signal generators	0	18	5	6	26
B 182	B3-11 Do you use time mark signal generators	7	22	11	8	12
B 183	B3-12 Do you use multi-function (square/sine/triangular) signal generators	25	52	44	26	14
B 184	B3-13 Do you use TV signal generators	2	4	3	2	7
D 284	D1-10 Do you perform tasks on voltage multipliers (doublers/triplers)	29	49	27	18	3
D 285	D1-11 Do you perform tasks on DC to DC converters	36	52	32	19	5
D 286	D1-12 Do you perform tasks on inverters (DC to AC converters)	63	46	29	18	5
D 287	D1-13 Do you perform tasks on switching power supplies	19	20	7	8	7
J 697	J4-1 Do you trace block diagrams of TV systems or subassemblies	0	0	2	2	0
J 698	J4-2 Do you trace schematic diagrams of TV systems or component circuits	0	0	1	1	0
J 699	J4-3 Do you troubleshoot TV systems to major subassemblies	0	0	2	1	0
J 700	J4-4 Do you troubleshoot TV systems to circuit level components	0	1	1	3	0
J 701	J4-5 Do you adjust or calibrate TV systems or components	0	0	2	2	0
J 702	J4-6 Do you trace block diagrams of laser systems or subassemblies	0	0	1	2	0
J 703	J4-7 Do you trace schematic diagrams of laser systems or component circuits	0	0	1	1	0
J 704	J4-8 Do you troubleshoot laser systems to major subassemblies	0	0	1	1	0
J 705	J4-9 Do you troubleshoot laser systems to circuit level components	0	0	1	1	0
J 706	J4-10 Do you adjust or calibrate laser systems or components	0	0	1	1	0
J 707	J4-11 Do you trace block diagrams of infrared systems or subassemblies	0	1	12	2	0
J 708	J4-12 Do you trace schematic diagrams of infrared systems or component circuits	0	1	9	1	0
J 709	J4-13 Do you troubleshoot infrared systems to major subassemblies	0	1	11	1	0
J 710	J4-14 Do you troubleshoot infrared systems circuit level components	0	1	8	1	0
J 711	J4-15 Do you inspect, clean, or service infrared systems or components	0	1	12	1	0
J 712	J4-16 Do you adjust or calibrate infrared systems or components	0	0	8	1	0

### Report Option Table for Modules

Option	Status
Primary Sort	Inventory Sequence
Secondary Sort	Not Used
Print Suppress	Not Used

### Report Option Table for Tasks

Option	Status
Primary Sort	Inventory Sequence
Secondary Sort	Not Used
Print Suppress	Not Used

### Description of Reported Module Factors

Col	Factor	Source vector	Title	Module Statement	Number Members	Mean	S.D.	Based on All Tasks Within Range	Min	Max	Valid
1	TITLE										

### Description of Reported Task Factors

Col	Factor	Source vector	Title	Task Statement	Number Members	Mean	S.D.	Based on All Tasks Within Range	Min	Max	Valid
1	TITLE										
2	F0014	GP0014/PMF		All DAFSC 30351	278	45.58	27.00	97.84	.36	97.84	712
3	F0015	GP0015/PMF		All DAFSC 30352	139	36.06	25.12	98.56	.72	98.56	712
4	F0016	GP0016/PMF		All DAFSC 30353	186	34.69	24.04	98.92	1.08	98.92	712
5	F0038	GP0041/PMF		All DAFSC 30450	240	26.65	23.10	97.50	.00	97.50	712
6	F0039	GP0042/PMF		All DAFSC 30451	171	37.50	27.49	97.66	.00	97.66	712
7	F0040	GP0043/PMF		All DAFSC 30454	297	34.75	26.12	96.97	.00	96.97	712
8	F0017	GP0020/PMF		All DAFSC 30456	212	22.36	19.51	93.87	.94	93.87	712
9	F0018	GP0021/PMF		All DAFSC 30554	985	24.20	24.02	97.16	.00	97.16	712
10	F0088	GP0111/PMF		All DAFSC 455X1A	212	12.02	18.72	98.58	.00	98.58	712
11	F0089	GP0112/PMF		All DAFSC 455X1B	169	11.59	18.15	98.82	.00	98.82	712
12	F0090	GP0113/PMF		All DAFSC 455X1C	172	10.89	17.26	97.67	.00	97.67	712

Col	Factor	Source vector	Title	Number Members	----- Based on All Tasks Within Range -----			
					Mean	S.D.	Max	Min Valid
13	F0091	GP0114/PHP	All DAFSC 455X2A	193	30.27	23.35	98.45	.00 712
14	F0092	GP0115/PHP	All DAFSC 455X2B	148	20.78	18.38	97.97	.00 712
15	F0093	GP0116/PHP	All DAFSC 455X2C	87	21.43	20.52	98.85	.00 712

Electronic Principles Inventory (EPI) data for Air Force specialties is presented below in Keesler EP POI order. Data for this report was collected from job incumbents during the period March 1987 - September 1988

Percent members responding "YES" is shown for each specialty listed. Where skill level is not specified, both 5 and 7 skill levels are included (e.g., DAFSC 000X0 includes 00050 and 00070).

For assistance in using this EPI printout phone USAFOMC/OMYA, at AUTOVON 487-6623.

D	T	Y	Tsk	Nbr	Task Title	303	303	303	303	304	304	304	304	305	455	455	455	455	455	455
						51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C	

0001 POI ESAQR30020 009, ELECTRONIC PRINCIPLES, Dated 1 June 1987 KEESLER TECHNICAL TRAINING CENTER Volume 1 of 4 Volumes

0002 I. DC Circuits

0003 I 1. Orientation, Safety, and First Aid 1/2

0004 I 1a. Orientation (1)

A 1 A1-1 Do you use metric terms (example milli, kilo, mega) 90 88 85 91 86 81 81 74 75 68 66 78 79 79

0005 I 1b. Given four questions, each containing four options, select the option for each question that describes a major safety precaution to be observed when working on electrical equipment IAW ST-REP-10, Chap 1. Four out of four questions must be answered correctly. CTS: 1a Meas: W (0/1)

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Y Nbr

Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0006 I 1c. Given four questions, each consisting of four options, select the option for each question which describes a first aid measure to be used for the treatment of electrical shock IAW ST-KEP-10, Chap 1. Four of the four questions must be answered correctly. CTS: 1b Meas: W (0/.5)

0007 I 1d. Given two questions, each consisting of three options, select the option for each question that states the type of fire extinguisher to be used for electrical fires IAW ST-KEP-10, Chap 1. Two of the two questions must be answered correctly. CTS: 1a Meas: W (0/.5)

0008 I 2. Prefixes and Powers of Ten 7/0

0009 I 2a. Given three questions requiring addition of two two-digit numbers expressed with powers of ten, with three options for each question, select the option for each question which expresses the answer as a power of ten IAW ST-KEP-10, Chap 2. Two out of three questions must be answered correctly. CTS: 2a Meas: W (1)

0010 I 2b. Given three questions requiring subtraction of two two-digit numbers expressed with powers of ten, with three options for each question, select the option for each question which expresses the answer as a power of ten IAW ST-KEP-10, Chap 2. Two out of three questions must be answered correctly. CTS: 2a Meas: W (1)

A 1 A1-1 Do you use metric terms (example mili, kilo, mega) 90 88 85 91 86 81 81 74 75 68 66 78 79 79



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T Task  
Y Nbr

Task Title

303 303 303 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0011 I 2c. Given three questions requiring multiplication of two two-digit numbers expressed with powers of ten, with three options for each question, select the option for each question which expresses the answer as a power of ten IAW ST-KEP-10, Chap 2. Two out of three questions must be answered correctly. CTS: 2a Meas: W (1)

A 1 A1-1 Do you use metric terms (example milli, kilo, mega) 90 88 85 91 86 81 81 74 75 68 66 78 79 79

0012 I 2d. Given three questions requiring division of two two-digit numbers expressed with powers of ten, with three options for each question, select the option for each question which expresses the answer as a power of ten IAW ST-KEP-10, Chap 2. Two out of three questions must be answered correctly. CTS: 2a Meas: W (1)

A 1 A1-1 Do you use metric terms (example milli, kilo, mega) 90 88 85 91 86 81 81 74 75 68 66 78 79 79

0013 I 2e. Given three questions, each with a two-digit number expressed as a power of ten requiring extraction of the square root and three options expressed as a power of ten, select the option for each question which represents the square root IAW ST-KEP-10, Chap 2. Two out of three questions must be answered correctly. CTS: 2a Meas: W (1)

A 1 A1-1 Do you use metric terms (example milli, kilo, mega) 90 88 85 91 86 81 81 74 75 68 66 78 79 79

0014 I 2f. Given three questions, each containing an electrical prefix and three options expressed in powers of ten, select the option for each question that represents the given prefix expressed as a power of ten IAW ST-KEP-10, Chap 2. Two out of three questions must be answered correctly. CTS: 2a Meas: W (1)

A 1 A1-1 Do you use metric terms (example milli, kilo, mega) 90 88 85 91 86 81 81 74 75 68 66 78 79 79

D  
T Task  
Y Nbr

Task Title

303 303 303 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0015 I 2g. Given three questions, each containing a number expressed with an electrical prefix and three options expressed with electrical prefixes, select the option for each question which indicates the given number converted to another electrical prefix IAW ST-KEP-10, Chap 2. Two of the three questions must be answered correctly. CTS: 2a Meas: W (1)

A 1 A1-1 Do you use metric terms (example milli, kilo, mega) 90 88 85 91 86 81 81 74 75 68 66 78 79 79

0016 I 3. Direct Current and Voltage 3/0

0017 I 3a. Given three questions, each with four options, select the option for each question which states the relative quantity of free electrons within a conductor, IAW ST-KEP-10, Chap 3. Two out of three questions must be answered correctly. CTS: 3a Meas: W (.5)

A 2 A1-2 Do you use basic DC electrical/electronic terms 98 99 99 98 97 97 94 96 98 95 94 98 97 97

0018 I 3b. Given three questions, each with four options, select the option for each question which states the relative quantity of free electrons within an insulator, IAW ST-KEP-10, Chap 3. Two out of three questions must be answered correctly. CTS: 3a Meas: W (.5)

A 2 A1-2 Do you use basic DC electrical/electronic terms 98 99 99 98 97 97 94 96 98 95 94 98 97 97

0019 I 3c. Given three questions, each with three options, select the option for each question that describes the movement of free electrons within a conductor IAW ST-KEP-10, Chap 3. Two out of three questions must be answered correctly. CTS: 3a Meas: W (.5)

A 2 A1-2 Do you use basic DC electrical/electronic terms 98 99 99 98 97 97 94 96 98 95 94 98 97 97

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Y Nbr

Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0020 I 3d. Given three questions, each with three options,  
select the option for each question that illustrates  
the symbol for electron flow and the name and symbol  
for its unit of measurement IAW ST-KEP-10, Chap 3.  
Two of the three questions must be answered correctly.  
CTS: 3a Meas: W (.5)

A 2 A1-2 Do you use basic DC electrical/electronic terms 98 99 99 98 97 97 94 96 98 98 95 94 98 97 97

0021 I 3e. Given three questions, each containing three options,  
select the option for each question that illustrates  
the symbol for voltage and the name and symbol for  
its unit of measurement IAW ST-KEP-10, Chap 3. Two  
of the three questions must be answered correctly.  
CTS: 3a Meas: W (.5)

A 2 A1-2 Do you use basic DC electrical/electronic terms 98 99 99 98 97 97 94 96 98 98 95 94 98 97 97

0022 I 3f. Given three questions, each containing three options,  
select the option for each question that illustrates  
the three requirements for current flow IAW ST-KEP-10.  
Chap 3. Two of the three questions must be answered  
correctly. CTS: 3b Meas: W (.5)

A 2 A1-2 Do you use basic DC electrical/electronic terms 98 99 99 98 97 97 94 96 98 98 95 94 98 97 97  
A 4 A1-4 Do you trace schematic or block diagrams of circuits  
containing conductors, fuses, lamps, switches, or batteries 95 90 92 96 96 94 86 93 98 98 95 95 95 98

0023 I 4. Resistance, Resistors and Schematic Symbols 1.5/2

0024 I 4a. Given three questions, each with four options  
pertaining to resistance, select the option for each  
question that describes resistance, IAW ST-KEP-10,  
Chap 4. Two of three questions must be answered  
correctly. CTS: 3a Meas: W (.5)

A 2 A1-2 Do you use basic DC electrical/electronic terms 98 99 99 98 97 97 94 96 98 98 95 94 98 97 97

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Y Nbr

## Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0025 I 4b. Given three questions, each containing three options, select the option for each question that illustrates the symbol for resistance and the name and symbol for its unit of measurement IAW ST-KEP-10, Chap 4. Two of the three questions must be answered correctly. CIS: 3a Meas: W (.5)

A 2	Al-2 Do you use basic DC electrical/electronic terms	98	99	99	98	97	97	94	96	98	95	94	98	97	97
A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	77	82

0026 I 4c. Given resistor pictorials of carbon, fixed, slide tap, fixed tap and a potentiometer, and a list of their names, match each pictorial to its name IAW ST-KEP-10, Chap 4. Three of the five must be matched correctly. CIS: 4b Meas: W (0/.5)

A 2	Al-2 Do you use basic DC electrical/electronic terms	98	99	99	98	97	97	94	96	98	95	94	98	97	97
A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82
A 11	Al-11 Do you calibrate or adjust circuits by using variable resistors	92	85	90	84	92	85	74	77	67	62	63	82	59	69

0027 I 4d. Given schematic symbols of fixed and tapped resistors, a potentiometer and a list of their names, match each symbol with its name IAW ST-KEP-10, Chap 4. Two of the three schematic symbols must be matched correctly. CIS: 4b Meas: W (0/.5)

A 2	Al-2 Do you use basic DC electrical/electronic terms	98	99	99	98	97	97	94	96	98	95	94	98	97	97
A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	76	75	78	90	78	82
A 11	Al-11 Do you calibrate or adjust circuits by using variable resistors	92	85	90	84	92	85	74	77	67	62	63	82	59	69

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Y Nbr

## Task Title

303 303 303 304 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0028

I 4e. Given schematic symbols of a battery, fuse, lamp and switch, and a list of their names, match each symbol with its name IAW ST-KEP-10, Chap 4. Three of the four matches must be correct.

CTS: 4b Meas: W

(0/.5)

A 2

A1-2 Do you use basic DC electrical/electronic terms

A 4

A1-4 Do you trace schematic or block diagrams of circuits containing conductors, fuses, lamps, switches, or batteries

98 99 99 98 97 97 94 96 98 95 94 98 97 97  
95 90 92 96 96 94 86 93 98 95 95 95 95 98

0029

I 4f. Given schematic symbols of an ammeter, ohmmeter and voltmeter, and a list of their names, match each symbol with its name IAW ST-KEP-10, Chap 4. Three of the four matches must be correct.

CTS: 4b Meas: W

(0/.5)

A 2

A1-2 Do you use basic DC electrical/electronic terms

98 99 99 98 97 97 94 96 98 95 94 98 97 97

0030

I 4g. Given three questions, each with a carbon resistor pictorial having four color coded bands, four options, and a resistor color code chart, select the option for each question stating the resistance value IAW ST-KEP-10, Chap 4. Two out of three questions must be answered correctly.

CTS: 4c Meas: W

(.5)

A 2

A1-2 Do you use basic DC electrical/electronic terms

98 99 99 98 97 97 94 96 98 95 94 98 97 97

A 13

A1-13 Do you determine ohmic value of a resistor using the color code

80 81 90 72 87 82 49 57 46 34 38 74 55 55

0031

I 5. Multimeter Uses

(4/0)

D	T	Tsk	Nbr
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Task Title

**303 303 303 304 304 304 305 455 455 455 455**

**51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C**

0032 I 5a. Given the names of multimeter controls; FUNCTION, RANGE, OHMS ZERO, and three statements pertaining to their purpose, match the name of each control to its purpose IAW ST-KEP-10, Chap 5. Two of the three matches must be correct.  
CTS: 5a, 5b, 5c Meas: W (.25)

D  
T Task  
Y Nbr

Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0036 I 5e. Given three multimeter pictorials each with the FUNCTION switch set to the AC position and a specific RANGE control setting and four options, select the option for each question that states the AC voltage value IAW ST-KEP-10, Chap 5. Two out of three questions must be answered correctly. CTS: 5a Meas: W (.25)

B 154 B1-2 Do you use the multimeter to measure AC voltage values 95 87 89 95 97 92 87 94 99 99 98 98 95 99

0037 I 5f. Given a multimeter and DC trainer to include three different resistors, measure the ohmic value of each resistor with + or - 10 percent accuracy, IAW ST-KEP-10, Chap 5. CTS: 4a Meas: PC, W (1)

A 14 A1-14 Do you ohm check resistors  
B 159 B1-7 Do you use the multimeter to measure circuit resistance 90 84 89 85 91 84 61 74 71 63 62 89 65 70  
B 160 B1-8 Do you use the multimeter to measure component resistance 80 76 85 82 84 77 74 70 90 88 88 85 82 79  
90 85 87 89 93 85 70 82 90 83 79 92 72 70

0038 I 5g. Given a DC power supply, multimeter, and trainer with a three resistor series circuit, measure the DC voltage across each resistor with + or - 10 percent accuracy IAW ST-KEP-10, Chap 5. CTS: 5a Meas: PC, W (1)

B 153 B1-1 Do you use the multimeter to measure DC voltage values 95 88 89 97 98 93 86 97 99 97 98 98 98 99  
B 168 B4-4 Do you use digital multimeters 94 83 89 95 94 91 84 94 93 91 87 94 89 92

0039 I 5h. Given an AC source and multimeter connected to an AC voltage, measure the AC voltage with + or - 10 percent accuracy IAW ST-KEP-10, Chap 5. CTS: 5a Meas: PC, W (.75)

B 154 B1-2 Do you use the multimeter to measure AC voltage values 95 87 89 95 97 92 87 94 99 99 98 98 95 99  
B 175 B3-4 Do you use audio sine-wave signal generators 27 20 31 64 53 75 40 23 15 4 10 63 46 38

D	T	Tsk	Nbr
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Task Title

303	303	303	304	304	304	305	455	455	455	455	455	455
51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B X2C

## 0040 I 6. Resistive Circuits

10/4

0041 I 6a. Given three questions each containing three schematic diagrams, select the diagram in each question which satisfies the requirements for a DC circuit IAW ST-KEP-10, Chap 6. Two of the three diagrams selected must be correct. CTS: 3b Meas: W (1.5)

**A 4 A1-4 Do you trace schematic or block diagrams of circuits containing conductors, fuses, lamps, switches, or batteries**

0042 I 6b. Given three questions each with four options, select the option for each question which describes the relationship between resistance, current and voltage as stated by OHM's LAW IAW ST-KEP-10, Chap 6. Two out of three questions must be answered correctly. CTS: 2b Meas: W (0/1.5)

**A 9** Al-9 Do you trace schematic or block diagrams of circuits containing resistors

**A 12** Al-12 Do you calculate the value of a resistor required for a circuit

A	12	Al-12 Do you calculate the value of a resistor required for a circuit?	46	50	68	47	56	45	29	30	23	21	22	42	26	26
---	----	--	----	----	----	----	----	----	----	----	----	----	----	----	----	----

I 6c. Given three questions each consisting of a series circuit schematic diagram with three resistors, individual resistance values, applicable formulas and four options, select the option for each question that states the total circuit resistance IAW ST-REP-10, Chap 6. Two of the three questions must be answered correctly. CTS: 4d Meas: W (0/5)

**A 6 A1-6 Do you calculate values of DC voltage, current, resistance, or power**

**A 9 Al-9 Do you trace schematic or block diagrams of circuits containing resistors**



D  
Task  
Y Nbr

Task Title

303 303 303 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0044 I 6d. Given three questions each consisting of a series circuit schematic diagram with three resistors, applied voltage, total resistance, applicable formulas and four options, select the option for each question that states the total current IAW ST-KEP-10, Chap 6. Two out of the three questions must be answered correctly. CTS: 4d Meas: W (0.5)

A	6	Al-6 Do you calculate values of DC voltage, current, resistance, or power	70	67	72	54	75	62	47	47	32	38	35	54	43	37
A	9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82

0045 I 6e. Given three questions each consisting of a series circuit schematic diagram with three resistors, individual resistance values, total current, applicable formulas and four options, select the option for each question that states the voltage developed across a selected resistor IAW ST-KEP-10, Chap 6. Two of the three questions must be answered correctly. CTS: 4d Meas: W (0.5)

A	6	Al-6 Do you calculate values of DC voltage, current, resistance, or power	70	67	72	54	75	62	47	47	32	38	35	54	43	37
A	9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82

0046 I 6f. Given three questions each consisting of a series circuit schematic diagram with three resistors, applied voltage, total current, applicable formulas and four options, select the option for each question that states the total circuit power dissipated IAW ST-KEP-10, Chap 6. Two out of three questions must be answered correctly. CTS: 4d Meas: W (0.5)

A	6	Al-6 Do you calculate values of DC voltage, current, resistance, or power	70	67	72	54	75	62	47	47	32	38	35	54	43	37
A	9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82

PRTHOD

Keesler CETP AFSCs matched to Keesler EP POI (1 / 2) PH0039

Occupational Analysis Program  
USAFOMC (ATC) Randolph AFB TX

Page 14

D  
T Tsk  
Y Nbr

Task Title

303 303 303 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0047 I 6g. Given three questions each consisting of a parallel circuit schematic diagram with three resistors, individual resistance values, applicable formulas and four options, select the option for each question that states the total resistance IAW ST-KEP-10, Chap 6. Two of the three questions must be answered correctly. CTS: 4d Meas: W (0.5)

A	6	Al-6 Do you calculate values of DC voltage, current, resistance, or power	70	67	72	54	75	62	47	47	32	38	35	54	43	37
A	9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82

0048 I 6h. Given three questions each consisting of a parallel circuit schematic diagram with three resistors, total resistance, applied voltage, applicable formulas and four options, select the option for each question that states the total current IAW ST-KEP-10, Chap 6. Two of the three questions must be answered correctly. CTS: 4d Meas: W (0.5)

A	6	Al-6 Do you calculate values of DC voltage, current, resistance, or power	70	67	72	54	75	62	47	47	32	38	35	54	43	37
A	9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82

0049 I 6i. Given three questions each consisting of a parallel circuit schematic diagram with three resistors, total resistance, applied voltage, applicable formulas and four options, select the option for each question that states the total circuit power dissipated IAW ST-KEP-10, Chap 6. Two of the three questions must be answered correctly. CTS: 4d Meas: W (0.5)

A	6	Al-6 Do you calculate values of DC voltage, current, resistance, or power	70	67	72	54	75	62	47	47	32	38	35	54	43	37
A	9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82

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Task Title

303 303 303 304 304 304 305 455 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0050 I 6j. Given three questions each consisting of a parallel circuit schematic diagram with three resistors, individual resistance values, applied voltage, applicable formulas and four options, select the option for each question that states the current flow in a selected branch IAW ST-KEP-10, Chap 6. Two of the three questions must be answered correctly. CTS: 4d Meas: W (0.5)

A	6	Al-6 Do you calculate values of DC voltage, current, resistance, or power	70	67	72	54	75	62	47	47	32	38	35	54	43	37
A	9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82

0051 I 6k. Given three questions each consisting of a series-parallel circuit schematic diagram with three resistors, individual resistance values, applicable formulas and four options, select the option for each question that states the total resistance IAW ST-KEP-10, Chap 6. Two out of the three questions must be answered correctly. CTS: 4d Meas: W (0.5)

A	6	Al-6 Do you calculate values of DC voltage, current, resistance, or power	70	67	72	54	75	62	47	47	32	38	35	54	43	37
A	9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82

0052 I 6l. Given three questions each consisting of a series-parallel circuit schematic diagram with three resistors, individual resistance values, applied voltage, applicable formulas and four options, select the option for each question that states the total current IAW ST-KEP-10, Chap 6. Two out of the three questions must be answered correctly. CTS: 4d Meas: W (0.5)

A	6	Al-6 Do you calculate values of DC voltage, current, resistance, or power	70	67	72	54	75	62	47	47	32	38	35	54	43	37
A	9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82

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Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455 455  
 51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0053 I 6m. Given three questions each consisting of a series-parallel circuit schematic diagram with three resistors, individual resistance values, applied voltage, total current, individual branch currents, applicable formulas and four options, select the option for each question that states the voltage developed across a selected resistor IAW ST-KEP-10, Chap 6. Two out of the three questions must be answered correctly.  
 CTS: 4d Meas: W (0/.5)

A 6 A1-6 Do you calculate values of DC voltage, current, resistance, or power 70 67 72 54 75 62 47 47 32 38 35 54 43 37  
 A 9 A1-9 Do you trace schematic or block diagrams of circuits containing resistors 94 86 90 88 93 88 70 80 78 75 78 90 78 82

0054 I 6n. Given three questions each consisting of a series-parallel circuit schematic diagram with three resistors, individual resistance values, applied voltage, total current, applicable formulas and four options, select the option for each question that states the total circuit power dissipated IAW ST-KEP-10, Chap 6. Two out of the three questions must be answered correctly. CTS: 4d Meas: W (0/.5)

A 6 A1-6 Do you calculate values of DC voltage, current, resistance, or power 70 67 72 54 75 62 47 47 32 38 35 54 43 37  
 A 9 A1-9 Do you trace schematic or block diagrams of circuits containing resistors 94 86 90 88 93 88 70 80 78 75 78 90 78 82

0055 I 6o. Given three questions, each consisting of three resistive bridge circuit diagrams with individual resistance values, applied voltage, and applicable formulas, select the option for each question that indicates a balanced bridge IAW ST-KEP-10, Chap 6. Two out of three questions must be answered correctly.  
 CTS: 4d Meas: W (0/.5)

A 6 A1-6 Do you calculate values of DC voltage, current, resistance, or power 70 67 72 54 75 62 47 47 32 38 35 54 43 37  
 A 9 A1-9 Do you trace schematic or block diagrams of circuits containing resistors 94 86 90 88 93 88 70 80 78 75 78 90 78 82  
 A 12 A1-12 Do you calculate the value of a resistor required for a circuit 46 50 68 47 56 45 29 30 23 21 22 42 26 26

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Task Title

303 303 303 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0056 I 6p. Given three questions, each consisting of a resistive bridge circuit schematic diagram, individual resistance values for three of the four resistors, applied voltage, applicable formulas and four options, select the option for each question that states the unknown value of resistance required to balance the resistive bridge circuit IAW ST-KEP-10, Chap 6. Two of the three questions must be answered correctly.  
CTS: 4d Meas: W (0/.5)

A 6 A1-6 Do you calculate values of DC voltage, current, resistance, or power 70 67 72 54 75 62 47 47 32 38 35 54 43 37  
A 9 A1-9 Do you trace schematic or block diagrams of circuits containing resistors 94 86 90 88 93 88 70 80 78 75 78 90 78 82

0057 I 6q. Given a multimeter, a trainer with a three-resistor series-parallel circuit, measure the total resistance within + or - 10 percent accuracy IAW ST-KEP-10, Chap 6. CTS: 5c Meas: PC, W (1)

A 9 A1-9 Do you trace schematic or block diagrams of circuits containing resistors 94 86 90 88 93 88 70 80 78 75 78 90 78 82  
A 14 A1-14 Do you ohm check resistors 90 84 89 85 91 84 61 74 71 63 62 89 65 70  
B 159 B1-7 Do you use the multimeter to measure circuit resistance 80 76 85 82 84 77 74 70 90 88 88 85 82 79  
B 188 B4-4 Do you use digital multimeters 94 83 89 95 94 91 84 94 93 91 87 94 89 92

0058 I 6r. Given a multimeter, a trainer with a three-resistor series-parallel circuit, and a DC voltage power supply, measure the individual voltages within + or - 10 percent accuracy IAW ST-KEP-10, Chap 6. CTS: 5a Meas: PC, W (1.5)

A 9 A1-9 Do you trace schematic or block diagrams of circuits containing resistors 94 86 90 88 93 88 70 80 78 75 78 90 78 82  
B 153 B1-1 Do you use the multimeter to measure DC voltage values 95 88 89 97 98 93 86 97 99 97 98 98 98 99  
B 188 B4-4 Do you use digital multimeters 94 83 89 95 94 91 84 94 93 91 87 94 89 92

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Task Title

303 303 303 304 304 304 305 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0059 I 6s. Given a multimeter, trainer with a loaded voltage divider having four taps and a movable ground and a DC voltage power supply, determine the voltage at each tap with respect to the ground reference point within + or - 10 percent accuracy IAW ST-KEP-10, Chap 6. CTS: 5a Meas: PC, W (1.5)

A	9	A1-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82
B	153	B1-1 Do you use the multimeter to measure DC voltage values	95	88	89	97	98	93	86	97	99	97	98	98	98	99
B	188	B4-4 Do you use digital multimeters	94	83	89	95	94	91	84	94	93	91	87	94	89	92

0060 I 7. Troubleshooting DC Resistive Circuits 7.5/2

0061 I 7a. Given three questions, each consisting of a series circuit schematic diagram with three resistors, symptoms of a malfunction, and four options, select the option for each question that describes the malfunction IAW ST-KEP-10, Chap 7. Two of the three questions must be answered correctly. (1.5)  
CTS: 4e Meas: W

A	5	A1-5 Do you troubleshoot circuits containing conductors, fuses, lamps, switches, or batteries	94	89	91	93	92	93	83	89	96	95	94	93	91	97
A	9	A1-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82
A	10	A1-10 Do you troubleshoot circuits to isolate a faulty resistor	88	83	89	82	90	83	57	69	65	51	49	85	61	61

0062 I 7b. Given three questions, each consisting of a parallel circuit schematic diagram with three resistors, symptoms of a malfunction, and four options, select the option for each question that describes the malfunction IAW ST-KEP-10, Chap 7. Two of the three questions must be answered correctly. (1)  
CTS: 4e Meas: W

A	5	A1-5 Do you troubleshoot circuits containing conductors, fuses, lamps, switches, or batteries	94	89	91	93	92	93	83	89	96	95	94	93	91	97
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D	Tsk	Task Title	303	303	303	304	304	304	304	304	305	455	455	455	455	455	455
V	Nbr		51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C	
A	9	A1-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82	
A	10	A1-10 Do you troubleshoot circuits to isolate a faulty resistor	88	83	89	82	90	83	57	69	65	51	49	85	61	61	

0063 I 7c. Given three questions, each consisting of a series-parallel circuit schematic diagram with three resistors, symptoms of a malfunction and four options, select the option for each question that describes the malfunction IAW ST-KEP-10, Chap 7. Two of the three questions must be answered correctly.  
CTS: 4e Meas: W (0/2)

A	5	A1-5 Do you troubleshoot circuits containing conductors, fuses, lamps, switches, or batteries	94	89	91	93	92	93	83	89	96	95	94	93	91	97
A	9	A1-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82
A	10	A1-10 Do you troubleshoot circuits to isolate a faulty resistor	88	83	89	82	90	83	57	69	65	51	49	85	61	61

0064 I 7d. Given a multimeter, DC Power Supply, a trainer consisting of a three resistor series-parallel circuit and three individually inserted malfunctions, locate the faulty component IAW ST-KEP-10, Chap 7. Two of the three malfunctions must be identified correctly.  
CTS: 4e, 5d Meas: PC, W (5)

A	5	A1-5 Do you troubleshoot circuits containing conductors, fuses, lamps, switches, or batteries	94	89	91	93	92	93	83	89	96	95	94	93	91	97
A	9	A1-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82
A	12	A1-12 Do you calculate the value of a resistor required for a circuit	46	50	68	47	56	45	29	30	23	21	22	42	26	26
B	153	B1-1 Do you use the multimeter to measure DC voltage values	95	88	89	97	98	93	86	97	99	97	98	98	98	99
B	156	B1-4 Do you use the multimeter to measure DC current values	86	73	78	75	69	61	71	68	60	62	57	72	58	57
B	159	B1-7 Do you use the multimeter to measure circuit resistance	80	76	85	82	84	77	74	70	90	88	88	85	82	79
B	160	B1-8 Do you use the multimeter to measure component resistance	90	85	87	89	93	85	70	82	90	83	79	92	72	70
B	188	B4-4 Do you use digital multimeters	94	83	89	95	94	91	84	94	93	91	87	94	89	92

0065 II. AC Circuits

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Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0066 II 1. Alternating Current

4.5/2

0067 II 1a. Given a sinewave pictorial with letters indicating cycle, alternation, peak amplitude and peak-to-peak amplitude with four terms identifying these areas, match each letter with its respective term IAW ST-KEP-20, Chap 1. Three out of four matched must be correct. CTS: 6 Meas: W (0/.5)

A 3 A1-3 Do you use basic AC electrical/electronic terms

98 97 99 96 97 97 93 91 98 96 94 98 97 97

0068 II 1b. Given three questions each containing an effective voltage with four options expressed in peak voltage and applicable formulas, select the option for each question which indicates the value of the peak voltage IAW ST-KEP-20, Chap 1. Two out of three of the responses must be correct. CTS: 6 Meas: W (0/.5)

A 7 A1-7 Do you calculate values of AC effective voltage, average voltage, or peak-to-peak voltage

64 64 65 50 71 59 44 44 26 31 30 53 41 33

0069 II 1c. Given three questions each containing an effective voltage with four options expressed in peak-to-peak voltage and applicable formulas, select an option for each question which indicates the value of the peak-to-peak voltage IAW ST-KEP 20, Chap 1. Two out of three of the responses must be correct. CTS: 6 Meas: W (0/.5)

A 7 A1-7 Do you calculate values of AC effective voltage, average voltage, or peak-to-peak voltage

64 64 65 50 71 59 44 44 26 31 30 53 41 33



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Task Title

303 303 303 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0070 II ld. Given three questions each containing a peak voltage and four options expressed in effective voltage with applicable formulas, select an option for each question which indicates the value of the effective voltage IAW ST-KEP-20, Chap 1. Two out of three responses must be correct. CTS: 6 Meas: W (.5)

A 7 A-7 Do you calculate values of AC effective voltage, average voltage, or peak-to-peak voltage 64 64 65 50 71 59 44 44 26 31 30 53 41 33

0071 II le. Given three questions each containing a peak voltage and four options expressed in peak-to-peak voltage with applicable formulas, select an option for each question which indicates the value of the peak-to-peak voltage IAW ST-KEP-20, Chap 1. Two out of three responses must be correct. CTS: 6 Meas: W (.5)

A 7 A1-7 Do you calculate values of AC effective voltage, average voltage, or peak-to-peak voltage 64 64 65 50 71 59 44 44 26 31 30 53 41 33

0072 II lf. Given three questions each containing a peak-to-peak voltage and four options expressed in effective voltage with applicable formulas, select the option for each question which indicates the value of the effective voltage IAW ST-KEP-20, Chap 1. Two of the three responses must be correct. CTS: 6 Meas: W (.5)

A 7 A1-7 Do you calculate values of AC effective voltage, average voltage, or peak-to-peak voltage 64 64 65 50 71 59 44 44 26 31 30 53 41 33

0073 II lg. Given three questions each containing a peak-to-peak voltage and four options expressed in peak voltage with applicable formulas, select the option for each question which indicates the value of the peak voltage IAW ST-KEP-20, Chap 1. Two of the three responses must be correct. CTS: 6 Meas: W (.5)

A 7 A1-7 Do you calculate values of AC effective voltage, average voltage, or peak-to-peak voltage 64 64 65 50 71 59 44 44 26 31 30 53 41 33

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Y Nbr

Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0074 II 1h. Given a pictorial representation of the frequency spectrum with letters representing audio, radio and microwave frequency ranges with three statements identifying these ranges, match each letter to its respective range IAW ST-KEP-20, Chap 1. Two of the three must be matched correctly.

CTS: 6 Meas: W (.5)

A 8 A1-8 Do you calculate values of frequency, phase relationship, or wave length 68 61 69 53 79 62 48 52 26 28 28 56 41 41

0075 II 1i. Given a pictorial representation of the frequency spectrum with letters representing VLF, LF, MF, and HF frequency ranges with four statements identifying these ranges, match each letter with the statement which identifies its range IAW ST-KEP-20, Chap 1. Three of the four must be matched correctly. CTS: 6 Meas: W

(.5)

A 8 A1-8 Do you calculate values of frequency, phase relationship, or wave length 68 61 69 53 79 62 48 52 26 28 28 56 41 41

0076 II 1j. Given a pictorial representation of the frequency spectrum with letters representing VHF, UHF, SHF, and EHF frequency ranges and four statements identifying these ranges, match each letter with the statement which identifies its range IAW ST-KEP-20, Chap 1. Three of the four must be matched correctly. CTS: 6 Meas: W

(.5)

A 8 A1-8 Do you calculate values of frequency, phase relationship, or wave length 68 61 69 53 79 62 48 52 26 28 28 56 41 41

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Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0077 II 1k. Given three questions each containing the frequency of a sine wave and applicable formulas with four options for each question that states the period for the given frequency IAW ST-KEP-20, Chap 1. Two of the three questions must be answered correctly. CTS: 6 Meas: W (.5)

A 8 A1-8 Do you calculate values of frequency, phase relationship, or wave length 68 61 69 53 79 62 48 52 26 28 28 56 41 41

0078 II 1l. Given three questions each containing the period of a sine wave and applicable formulas with four options for each question indicating frequency, select the option for each question that indicates the frequency for the given period IAW ST-KEP-20, Chap 1. Two of the three questions must be answered correctly. CTS: 6 Meas: W (.5)

A 8 A1-8 Do you calculate values of frequency, phase relationship, or wave length 68 61 69 53 79 62 48 52 26 28 28 56 41 41

0079 II 1m. Given three questions pertaining to wavelength each with three options, select the option for each question which defines wavelength IAW ST-KEP-20, Chap 1. Two out of the three must be answered correctly. CTS: 6 Meas: W (.5)

A 8 A1-8 Do you calculate values of frequency, phase relationship, or wave length 68 61 69 53 79 62 48 52 26 28 28 56 41 41

0080 II 2. Signal Generator and Oscilloscope 6.5/2

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Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0081 II 2a. Given a list of the controls on the FUNCTION GENERATOR, and a list of four statements describing their purpose, match each control to its function IAW ST-KEP-20, Chap 2. Three of the four matches must be correct. CTS: 39 Meas: W (0.5)

B 183 B3-12 Do you use multi-function (square/sine/triangular) signal generators 55 47 46 26 19 24 29 31 11 5 10 37 23 18

0082 II 2b. Given three questions each consisting of a pictorial diagram of the FUNCTION GENERATOR with indicated FREQUENCY, FREQUENCY MULTIPLIER, and STEP control setting and four options, select the option for each question that states the output frequency IAW ST-KEP-20, Chap 2. Two out of the three questions must be answered correctly. CTS: 39 Meas: W (0.5)

B 183 B3-12 Do you use multi-function (square/sine/triangular) signal generators 55 47 46 26 19 24 29 31 11 5 10 37 23 18

0083 II 2c. Given three questions, each containing a pictorial of an oscilloscope display with indicated attenuator and sweep control setting and four options, select the option for each question that indicates the peak-to-peak value of the displayed signal IAW ST-KEP-20, Chap 2. Two of the three questions must be correct. CTS: 16a Meas: W (.5/.5)

B 163 B2-3 Do you use the oscilloscope to measure AC voltage  
B 170 B2-10 Do you use attenuator probes with oscilloscopes 88 81 85 74 89 76 68 80 41 43 35 74 55 55  
88 81 81 57 82 78 65 56 25 26 24 73 47 57

0084 II 2d. Given three questions, each containing a pictorial of an oscilloscope display with indicated attenuator and sweep control settings and four options, select the option for each question that indicates the frequency of the displayed signal IAW ST-KEP-20, Chap 2. Two of the three questions must be correct. CTS: 16b, 16c Meas: W (0/1)

B 161 B2-1 Do you use the oscilloscope to measure time to determine frequency 89 79 87 66 87 66 67 83 33 37 31 73 50 53

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Task  
Y Nbr

Task Title

B 170 B2-10 Do you use attenuator probes with oscilloscopes  
303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C  
88 81 81 57 82 78 65 56 25 26 24 73 47 57

0085 II 2e. Given an oscilloscope, trainer, and DC power supply with a preset voltage, measure the DC voltage within + or - 10 percent accuracy IAW ST-KEP-20, Chap 2. CTS: 16a Meas: PC, W (1/.5)

B 164 B2-4 Do you use the oscilloscope to measure DC voltage  
94 85 87 77 94 79 71 88 40 39 35 73 56 54

0086 II 2f. Given an oscilloscope, trainer, and function generator with a preset voltage, measure the peak-to-peak amplitude of the AC voltage within + or - 10 percent accuracy IAW ST-KEP-20, Chap 2. CTS: 16a Meas: PC, W (1)

B 163 B2-3 Do you use the oscilloscope to measure AC voltage  
88 81 85 74 89 76 68 80 41 43 35 74 55 55

0087 II 2g. Given an oscilloscope, trainer, applicable formulas and function generator with preset frequency, determine the preset frequency within + or - 10 percent accuracy IAW ST-KEP-20, Chap 2. CTS: 16b, 16c Meas: PC, W (1.5)

B 161 B2-1 Do you use the oscilloscope to measure time to determine frequency  
89 79 87 66 87 66 67 83 33 37 31 73 50 53

0088 II 2h. Given a dual trace oscilloscope, trainer, function generator with preset voltage and frequency, determine the phase relationship of two signals having the same frequency within + or - 10 percent accuracy IAW ST-KEP-20, Chap 2. CTS: 16d Meas: PC, W (1.5)

B 169 B2-9 Do you use the oscilloscope to observe phase relationships  
84 72 75 50 75 52 62 67 36 40 33 63 36 38

0089 II 3. Capacitors and Capacitive Reactance 7/4



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 Y Mbr

Task Title

303 303 303 304 304 304 305 455 455 455 455 455 455 455  
 51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0093 II 3d. Given three questions each containing four options pertaining to the phase relationship of current and voltage, select the option for each question that describes the phase relationship between current and voltage across a capacitor IAW ST-KEP-20, Chap 3. Two out of the three questions must be answered correctly. CTS: 8a Meas: W (0/1)

A 27 A1-27 Do you trace schematic or block diagrams of circuits containing capacitors 93 83 90 86 93 86 71 80 75 74 72 86 65 74  
 A 31 A1-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors 38 42 49 33 43 36 25 20 17 16 28 19 21

0094 II 3e. Given three questions each with four options pertaining to capacitive reactance and applicable formulas, select the option for each question that describes the effects of changes in frequency and capacitance on capacitive reactance IAW ST-KEP-20, Chap 3. Two of the three questions must be answered correctly. CTS: 8b Meas: W (1)

A 27 A1-27 Do you trace schematic or block diagrams of circuits containing capacitors 93 83 90 86 93 86 71 80 75 74 72 86 65 74

0095 II 3f. Given three questions, each containing a three capacitor series circuit schematic diagram, with individual capacitance values indicated, applicable formulas and four options, select the option for each question that states total circuit capacitance IAW ST-KEP-20, Chap 3. Two of the three questions must be answered correctly. CTS: 8a, 8c Meas: W (1)

A 27 A1-27 Do you trace schematic or block diagrams of circuits containing capacitors 93 83 90 86 93 86 71 80 75 74 72 86 65 74  
 A 29 A1-29 Do you calculate values of circuit total capacitance 35 34 44 27 36 29 24 23 31 23 22 22 13 17

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Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0096

II 3g. Given three questions, each containing a three capacitor series circuit schematic diagram, applied frequency, total circuit capacitance indicated, applicable formulas and four options, select the option for each question that states total circuit reactance, IAW ST-KEP-20, Chap 3. Two of the three questions must be answered correctly. CTS: 8b, 8c Meas: W (1)

A 27

Al-27 Do you trace schematic or block diagrams of circuits containing capacitors

93 83 90 86 93 86 71 80 75 74 72 86 65 74

A 30

Al-30 Do you calculate values of circuit or component capacitive reactance

29 32 37 27 33 26 19 18 18 15 15 22 11 17

0097

II 3h. Given three questions, each containing a three capacitor series circuit schematic diagram, total circuit reactance, applied voltage, applicable formula and four options, select the option for each question that states total circuit current IAW ST-KEP-20, Chap 3. Two of the three questions must be answered correctly. CTS: 8c Meas: W (1)

A 27

Al-27 Do you trace schematic or block diagrams of circuits containing capacitors

93 83 90 86 93 86 71 80 75 74 72 86 65 74

A 31

Al-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors

38 42 49 33 43 36 25 20 17 16 28 19 21

0098

II 3i. Given three questions, each containing a three capacitor series circuit diagram, individual reactance values, total circuit current, applicable formulas and four options, select the option for each question that indicates the voltage developed across a selected capacitor IAW ST-KEP-20, Chap 3. Two of the three questions must be answered correctly. CTS: 8c Meas: W (1)

A 27

Al-27 Do you trace schematic or block diagrams of circuits containing capacitors

93 83 90 86 93 86 71 80 75 74 72 86 65 74

A 37

Al-37 Do you calculate transformer voltage or current step-up or step-down ratios

45 51 56 33 44 43 28 25 18 18 17 32 22 20



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T Tsk  
Y Nbr

Task Title

303 303 303 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0099 II 3j. Given three questions, each containing a three capacitor parallel circuit schematic diagram, individual capacitor values, applicable formulas and four options, select the option for each question that states the total circuit capacitance IAW ST-KEP-20, Chap 3. Two of the three questions must be answered correctly.  
CTS: 8a, 8c Meas: W (1)

A 27 A1-27 Do you trace schematic or block diagrams of circuits containing capacitors 93 83 90 86 93 86 71 80 75 74 72 86 65 74  
A 29 A1-29 Do you calculate values of circuit total capacitance 35 34 44 27 36 29 24 23 31 23 22 22 13 17

0100 II 3k. Given three questions, each containing a three capacitor parallel circuit schematic diagram, total capacitance, applied frequency, applicable formulas and four options, select the option for each question that states total circuit reactance IAW ST-KEP-20, Chap 3. Two of the three questions must be answered correctly. CTS: 8b, 8c Meas: W (0/1)

A 27 A1-27 Do you trace schematic or block diagrams of circuits containing capacitors 93 83 90 86 93 86 71 80 75 74 72 86 65 74  
A 30 A1-30 Do you calculate values of circuit or component capacitive reactance 29 32 37 27 33 26 19 18 18 15 15 22 11 17

0101 II 3l. Given a parallel circuit schematic diagram consisting of three capacitors in parallel with individual reactance values and applied voltage indicated, applicable formulas and three options for each branch current, select an option for each branch which correctly indicates its current IAW ST-KEP-20, Chap 3. Two of the three questions must be answered correctly. CTS: 8c Meas: W (0/1)

A 27 A1-27 Do you trace schematic or block diagrams of circuits containing capacitors 93 83 90 86 93 86 71 80 75 74 72 86 65 74  
A 31 A1-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors 38 42 49 33 43 36 25 20 17 16 28 19 21

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Task Title

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51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0102 II 4. Inductors, Inductive Reactance and Transformers

8.5/2

0103 II 4a. Given three questions each with four options and applicable formula pertaining to the factors affecting the strength of an electromagnetic field, select the option for each question which describes the effect changes in these factors have on the strength of the electromagnetic field IAW SI-KEP-20, Chap 4. Two of the three questions must be answered correctly.

CTS: 7a Meas: W

(1)

A 20 A1-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils

86 76 83 71 83 85 51 47 35 39 42 75 51 63

0104 II 4b. Given three questions each with four options, select the option for each question that identifies the symbol for inductance and the name and symbol for its unit of measurement IAW SI-KEP-20, Chap 4. Two out of three questions must be answered correctly.

CTS: 7a Meas: W

(0.5)

A 20 A1-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils

86 76 83 71 83 85 51 47 35 39 42 75 51 63

0105 II 4c. Given three questions each with four options pertaining to current and voltage phase relationships, select the option for each question that describes the phase relationship of current and voltage across an inductor IAW SI-KEP-20, Chap 4. Two of the three must be answered correctly. CTS: 7a Meas: W

(0.5)

A 24 A1-24 Do you calculate values of circuit voltage or current in circuits containing inductors

36 38 49 30 37 35 18 15 8 8 9 26 16 15

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51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0106 II 4d. Given three questions each with four options pertaining to inductive reactance and applicable formulas, select the option for each question that describes the effects of changes in frequency and inductance on inductive reactance IAW ST-KEP-20, Chap 4. Two of the three questions must be answered correctly. CTS: 7b Meas: W (0.5)

A 23 A1-23 Do you calculate values of circuit or component inductive reactance  
26 29 34 24 29 25 13 10 7 8 8 20 10 13

0107 II 4e. Given three questions, each containing a three inductor series circuit diagram, individual inductance values, applicable formulas and four options, select the option for each question that states total circuit inductance IAS ST-KEP-20, Chap 4. Two of the three questions must be answered correctly. CTS: 7a, 7c Meas: W (1)

A 20 A1-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils  
86 76 83 71 83 85 51 47 35 39 42 75 51 63  
A 22 A1-22 Do you calculate values of circuit total inductance  
31 29 38 26 30 26 16 11 7 8 8 21 11 13

0108 II 4f. Given three questions, each containing a three inductor series circuit schematic diagram, applied frequency, total circuit inductance, applicable formulas and four options, select the option for each question that states total circuit reactance, IAW ST-KEP-20, Chap 4. Two of the three questions must be answered correctly. CTS: 7b, 7c Meas: W (1)

A 20 A1-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils  
86 76 83 71 83 85 51 47 35 39 42 75 51 63  
A 23 A1-23 Do you calculate values of circuit or component inductive reactance  
26 29 34 24 29 25 13 10 7 8 8 20 10 13

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0109 II 4g. Given three questions, each containing a three inductor series circuit schematic diagram, applied voltage, total circuit reactance, applicable formulas and four options, select the option for each question that states total circuit current IAW ST-KEP-20, Chap 4. Two of the three questions must be answered correctly.  
CTS: 7c Meas: W (0.5)

A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	86	76	83	71	83	85	51	47	35	39	42	75	51	63
A 24	Al-24 Do you calculate values of circuit voltage or current in circuits containing inductors	36	38	49	30	37	35	18	15	8	8	9	26	16	15

0110 II 4h. Given three questions, each containing a three inductor series circuit schematic diagram, individual reactance values, total circuit current, applicable formulas and four options, select the option for each question that states the voltage developed across a selected inductor IAW ST-KEP-20, Chap 4. Two of the three questions must be answered correctly.  
CTS: 7c Meas: W (1)

A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	86	76	83	71	83	85	51	47	35	39	42	75	51	63
A 24	Al-24 Do you calculate values of circuit voltage or current in circuits containing inductors	36	38	49	30	37	35	18	15	8	8	9	26	16	15

0111 II 4i. Given three questions, each containing a three inductor parallel circuit schematic diagram, individual inductance values, applicable formulas and four options, select the option for each question that states total circuit inductance IAW ST-KEP-20, Chap 4. Two of the three questions must be answered correctly.  
CTS: 7a, 7c Meas: W (0/1)

A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	86	76	83	71	83	85	51	47	35	39	42	75	51	63
A 22	Al-22 Do you calculate values of circuit total inductance	31	29	38	26	30	26	16	11	7	8	8	21	11	13

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Task Title

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51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0112 II 4j. Given three questions, each containing a three inductor parallel circuit schematic diagram, total inductance, applied frequency, applicable formulas, and four options, select the option for each question that indicates total circuit reactance, IAW ST-KEP-20, Chap 4. Two of the three questions must be answered correctly. CTS: 7b, 7c Meas: W (0/1)

A 20 A1-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils 86 76 83 71 83 85 51 47 35 39 42 75 51 63  
A 23 A1-23 Do you calculate values of circuit or component inductive reactance 26 29 34 24 29 25 13 10 7 8 8 20 10 13

0113 II 4k. Given a parallel circuit schematic diagram consisting of three inductors with individual reactance values, and applied voltage indicated, applicable formulas and three options for each branch current, select an option for each branch which indicates the correct branch current IAW ST-KEP-20, Chap 4. Two of the three questions must be correctly answered. CTS: 7c Meas: W (1)

A 20 A1-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils 86 76 83 71 83 85 51 47 35 39 42 75 51 63  
A 23 A1-23 Do you calculate values of circuit or component inductive reactance 26 29 34 24 29 25 13 10 7 8 8 20 10 13

0114 II 4l. Given three questions, each with three options pertaining to transformer induction, select the option for each question that states the requirements for inducing a voltage in the secondary of a transformer IAW ST-KEP-20, Chap 4. Two of the three must be answered correctly. CTS: 9a Meas: W (0.5)

A 38 A1-38 Do you calculate impedance of transformers 28 28 34 25 28 26 15 14 7 9 8 20 11 13

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Task Title

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51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0115 II 4m. Given three questions, each containing a schematic diagram of a transformer, different peak input voltage, turns ratio, and three options, select the option for each question that indicates the correct output voltage, IAW ST-KEP-20, Chap 4. Two of the three questions must be answered correctly.  
CTS: 9a Meas: W (0.5)

A 35 A1-35 Do you trace schematic or block diagrams of circuits containing transformers 91 82 89 82 91 86 66 71 64 76 69 84 65 72  
A 37 A1-37 Do you calculate transformer voltage or current step-up or step-down ratios 45 51 56 33 44 43 28 25 18 18 17 32 22 20

0116 II 4n. Given four schematic diagrams of transformers with indicated input signals, to include one diagram with no sense dots and three diagrams with different arrangements of sense dots and two statements pertaining to the phase relationship of the output signal (in phase, 180 degrees out of phase), select a statement that identifies the relationship of the output to the input signal for each given circuit IAW ST-KEP-20, Chap 4. Three of the four questions must be answered correctly.  
CTS: 9a Meas: W (0.5)

A 35 A1-35 Do you trace schematic or block diagrams of circuits containing transformers 91 82 89 82 91 86 66 71 64 76 69 84 65 72

0117 II 5. Relays 1.5/0

0118 II 5a. Given three questions, each with a four contact relay schematic diagram and four options, select the option for each question that states the making contacts when the relay is energized IAW ST-KEP-20, Chap 5. Two of the three questions must be answered correctly. CTS: 7e, 15 Meas: PC

A 15 A1-15 Do you trace schematic or block diagrams of circuits containing relays 94 84 89 85 92 87 69 74 96 89 91 95 92 94



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Task Title

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51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0122 III lb. Given three questions, each with a schematic diagram of a series RCL circuit with indicated values of resistance, capacitance, inductance, applicable formula and four options, select the option for each question which indicates the resonant frequency, IAW ST-KEP-30, Chap 1. Two of the three questions must be answered correctly. CTS: 10b Meas: W (1)

A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82
A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	86	76	83	71	83	85	51	47	35	39	42	75	51	63
A 22	Al-22 Do you calculate values of circuit total inductance	31	29	38	26	30	26	16	11	7	8	8	21	11	13
A 23	Al-23 Do you calculate values of circuit or component inductive reactance	26	29	34	24	29	25	13	10	7	8	8	20	10	13
A 24	Al-24 Do you calculate values of circuit voltage or current in circuits containing inductors	36	38	49	30	37	35	18	15	8	8	9	26	16	15
A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	93	83	90	86	93	86	71	80	75	74	72	86	65	74
A 30	Al-30 Do you calculate values of circuit or component capacitive reactance	29	32	37	27	33	26	19	18	18	15	15	22	11	17
A 31	Al-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors	38	42	49	33	43	36	25	25	20	17	16	28	19	21
E 310	El-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	69	56	48	46	68	60	31	29	20	22	16	49	28	38

0123 III lc. Given the frequency response curve of a series RCL circuit and three questions with three options each, pertaining to circuit behavior as frequency approaches resonance, select the option for each question which states the effect on line current, total impedance and circuit operation respectively as resonance is approached, IAW ST-KEP-30, Chap 1. Two of three questions must be answered correctly. CTS: 10a Meas: W (1)

A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82
A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	86	76	83	71	83	85	51	47	35	39	42	75	51	63
A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	93	83	90	86	93	86	71	80	75	74	72	86	65	74
E 310	El-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	69	56	48	46	68	60	31	29	20	22	16	49	28	38



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E 314	El-5 Do you calculate values of impedance, voltage, or current in RCL circuits	303	303	303	304	304	304	304	305	455	455	455	455	455	455
		51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C
		23	26	22	13	22	22	11	9	5	5	5	13	8	11

0124 III 1d. Given the frequency response curve of a series RCL circuit and three questions with three options each, pertaining to circuit behavior as frequency departs from resonance, select the option for each question which states the effect on line current, total impedance and circuit operation respectively as frequency departs from resonance, IAW ST-KEP-30, Chap 1. Two of three questions must be answered correctly. CTS: 10a Meas: W (1)

A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82
A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	86	76	83	71	83	85	51	47	35	39	42	75	51	63
A 22	Al-22 Do you calculate values of circuit total inductance	31	29	38	26	30	26	16	11	7	8	8	21	11	13
A 23	Al-23 Do you calculate values of circuit or component inductive reactance	26	29	34	24	29	25	13	10	7	8	8	20	10	13
A 24	Al-24 Do you calculate values of circuit voltage or current in circuits containing inductors	36	38	49	30	37	35	18	15	8	8	9	26	16	15
A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	93	83	90	86	93	86	71	80	75	74	72	86	65	74
A 29	Al-29 Do you calculate values of circuit total capacitance	35	34	44	27	36	29	24	23	31	23	22	22	13	17
A 30	Al-30 Do you calculate values of circuit or component capacitive reactance	29	32	37	27	33	26	19	18	18	15	15	22	11	17
A 31	Al-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors	38	42	49	33	43	36	25	25	20	17	16	28	19	21
E 310	El-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	69	56	48	46	68	60	31	29	20	22	16	49	28	38
E 314	El-5 Do you calculate values of impedance, voltage, or current in RCL circuits	23	26	22	13	22	22	11	9	5	5	5	13	8	11

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51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

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III 1e. Given three questions, containing a series RCL circuit diagram with indicated values of applied voltage, frequency, resistance, capacitive reactance, inductive reactance, applicable formulas and three options for each question, select the option for each question which indicates the effect on total impedance when capacitance is changed without passing through resonance, IAW ST-KEP-30, Chap 1. Two of the three questions must be answered correctly.

CTS: 10a Meas: W

(1)

A 9

Al-9 Do you trace schematic or block diagrams of circuits containing resistors

A 20

Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils

A 22

Al-22 Do you calculate values of circuit total inductance

A 23

Al-23 Do you calculate values of circuit or component inductive reactance

A 24

Al-24 Do you calculate values of circuit voltage or current in circuits containing inductors

A 27

Al-27 Do you trace schematic or block diagrams of circuits containing capacitors

A 29

Al-29 Do you calculate values of circuit total capacitance

A 30

Al-30 Do you calculate values of circuit or component capacitive reactance

A 31

Al-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors

E 310

El-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits

E 314

El-5 Do you calculate values of impedance, voltage, or current in RCL circuits

94	86	90	88	93	88	70	80	78	75	78	90	78	82
86	76	83	71	83	85	51	47	35	39	42	75	51	63
31	29	38	26	30	26	16	11	7	8	8	21	11	13
26	29	34	24	29	25	13	10	7	8	8	20	10	13
36	38	49	30	37	35	18	15	8	8	9	26	16	15
93	83	90	86	93	86	71	80	75	74	72	86	65	74
35	34	44	27	36	29	24	23	31	23	22	22	13	17
29	32	37	27	33	26	19	18	18	15	15	22	11	17
38	42	49	33	43	36	25	20	17	16	28	19	21	
69	56	48	46	68	60	31	29	20	22	16	49	28	38
23	26	22	13	22	22	11	9	5	5	5	13	8	11

0126

III 1f. Given three questions, containing a series RCL circuit diagram with indicated values of applied voltage, frequency, resistance, capacitive reactance and inductive reactance, applicable formulas and three options for each question, select the option for each question which indicates the effect on total impedance when inductance is changed without passing through resonance, IAW ST-KEP-30, Chap 1. Two of the three questions must be answered correctly.

CTS: 10a Meas: W

(1)

A 5

Al-5 Do you troubleshoot circuits containing conductors, fuses, lamps, switches, or batteries

94	89	91	93	92	93	83	89	96	95	94	93	91	97
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 Task Title  
 E 314 E1-5 Do you calculate values of impedance, voltage, or current in RCL circuits  
 303 303 303 304 304 304 304 305 455 455 455 455 455 455  
 51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C  
 23 26 22 13 22 22 11 9 5 5 5 13 8 11

0128 III 1h. Given three questions, containing a series RCL circuit diagram with indicated values of applied voltage, frequency, resistance, capacitive reactance and inductive reactance, applicable formulas and three options for each question, select the option for each question which indicates the effects on total impedance when frequency is changed without passing through resonance, IAW ST-KEP-30, Chap 1. Two of the three questions must be answered correctly.  
 CTS: 10a Meas: W (.5/.5)

A 9 A1-9 Do you trace schematic or block diagrams of circuits containing resistors  
 A 20 A1-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils  
 A 22 A1-22 Do you calculate values of circuit total inductance  
 A 23 A1-23 Do you calculate values of circuit or component inductive reactance  
 A 24 A1-24 Do you calculate values of circuit voltage or current in circuits containing inductors  
 A 27 A1-27 Do you trace schematic or block diagrams of circuits containing capacitors  
 A 29 A1-29 Do you calculate values of circuit total capacitance  
 A 30 A1-30 Do you calculate values of circuit or component capacitive reactance  
 A 31 A1-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors  
 E 310 E1-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits  
 E 314 E1-5 Do you calculate values of impedance, voltage, or current in RCL circuits  
 94 86 90 88 93 88 70 80 78 75 78 90 78 82  
 86 76 83 71 83 85 51 47 35 39 42 75 51 63  
 31 29 38 26 30 26 16 11 7 8 8 21 11 13  
 26 29 34 24 29 25 13 10 7 8 8 20 10 13  
 36 38 49 30 37 35 18 15 8 8 9 26 16 15  
 93 83 90 86 93 86 71 80 75 74 72 86 65 74  
 35 34 44 27 36 29 24 23 31 23 22 13 17  
 29 32 37 27 33 26 19 18 15 15 22 11 17  
 38 42 49 33 43 36 25 20 17 16 28 19 21  
 69 56 48 46 68 60 31 29 20 22 16 49 28 38  
 23 26 22 13 22 22 11 9 5 5 5 13 8 11

0129 III 2. Parallel RCL Circuits 6/2.5

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51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

Task Title

0130 III 2a. Given three questions, containing a parallel RCL circuit diagram with indicated values of applied voltage, frequency, resistance, capacitive reactance, inductive reactance, applicable formulas and three options for each question, select the option for each question which indicates the effects on total impedance when resistance is changed IAW ST-KEP-30, Chap 2. Two of the three questions must be answered correctly. CTS: 10a Meas: W (.5/1.5)

A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82
A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	86	76	83	71	83	85	51	47	35	39	42	75	51	63
A 22	Al-22 Do you calculate values of circuit total inductance	31	29	38	26	30	26	16	11	7	8	8	21	11	13
A 23	Al-23 Do you calculate values of circuit or component inductive reactance	26	29	34	24	29	25	13	10	7	8	8	20	10	13
A 24	Al-24 Do you calculate values of circuit voltage or current in circuits containing inductors	36	38	49	30	37	35	18	15	8	8	9	26	16	15
A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	93	83	90	86	93	86	71	80	75	74	72	86	65	74
A 29	Al-29 Do you calculate values of circuit total capacitance	35	34	44	27	36	29	24	23	31	23	22	22	13	17
A 30	Al-30 Do you calculate values of circuit or component capacitive reactance	29	32	37	27	33	26	19	18	15	15	15	22	11	17
A 31	Al-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors	38	42	49	33	43	36	25	25	20	17	16	28	19	21
E 310	El-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	69	56	48	46	68	60	31	29	20	22	16	49	28	38
E 314	El-5 Do you calculate values of impedance, voltage, or current in RCL circuits	23	26	22	13	22	22	11	9	5	5	5	13	8	11

0131 III 2b. Given three questions each with a parallel RCL circuit diagram with indicated values of resistance, inductance, and capacitance, applicable formulas and four options, select the option for each question which indicates the resonant frequency IAW ST-KEP-30, Chap 2. Two of the three questions must be answered correctly. CTS: 10b Meas: W (0.5)

A 5	Al-5 Do you troubleshoot circuits containing conductors, fuses, lamps, switches, or batteries	94	89	91	93	92	93	83	89	96	95	94	93	91	97
A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	86	76	83	71	83	85	51	47	35	39	42	75	51	63
A 22	Al-22 Do you calculate values of circuit total inductance	31	29	38	26	30	26	16	11	7	8	8	21	11	13

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A 23	Al-23 Do you calculate values of circuit or component inductive reactance	26	29	34	24	29	25	13	10	7	8	8	20	10	13	
A 24	Al-24 Do you calculate values of circuit voltage or current in circuits containing inductors	36	38	49	30	37	35	18	15	8	8	9	26	16	15	
A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	93	83	90	86	93	86	71	80	75	74	72	86	65	74	
A 29	Al-29 Do you calculate values of circuit total capacitance	35	34	44	27	36	29	24	23	31	23	22	22	13	17	
A 30	Al-30 Do you calculate values of circuit or component capacitive reactance	29	32	37	27	33	26	19	18	18	15	15	22	11	17	
A 31	Al-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors	38	42	49	33	43	36	25	20	17	16	28	19	21		
E 310	E1-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	69	56	48	46	68	60	31	29	20	22	16	49	28	38	

0132 III 2c. Given the frequency response curve of a parallel RCL circuit and three questions with three options each, pertaining to circuit behavior as frequency approaches resonance, select the option for each question which states the effect upon line current, total impedance and circuit operation respectively as resonance is approached, IAW ST-KEP-30, Chap 2. Two out of three questions must be answered correctly. CTS: 10a, 10b Meas: W (1)

A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82	
A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	86	76	83	71	83	85	51	47	35	39	42	75	51	63	
A 22	Al-22 Do you calculate values of circuit total inductance	31	29	38	26	30	26	16	11	7	8	8	21	11	13	
A 23	Al-23 Do you calculate values of circuit or component inductive reactance	26	29	34	24	29	25	13	10	7	8	8	20	10	13	
A 24	Al-24 Do you calculate values of circuit voltage or current in circuits containing inductors	36	38	49	30	37	35	18	15	8	8	9	26	16	15	
A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	93	83	90	86	93	86	71	80	75	74	72	86	65	74	
A 29	Al-29 Do you calculate values of circuit total capacitance	35	34	44	27	36	29	24	23	31	23	22	22	13	17	
A 30	Al-30 Do you calculate values of circuit or component capacitive reactance	29	32	37	27	33	26	19	18	18	15	15	22	11	17	
A 31	Al-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors	38	42	49	33	43	36	25	20	17	16	28	19	21		
E 310	E1-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	69	56	48	46	68	60	31	29	20	22	16	49	28	38	
E 314	E1-5 Do you calculate values of impedance, voltage, or current in RCL circuits	23	26	22	13	22	22	11	9	5	5	5	13	8	11	

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51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

Task Title

0133 III 2d. Given the frequency response curve of a parallel RCL circuit and three questions with three options each, pertaining to circuit behavior as frequency departs from resonance, select the option for each question which states the effect upon line current, total impedance and circuit operation respectively as frequency departs from resonance IAW ST-KEP-30, Chap 2. Two of three questions must be answered correctly. CTS: 10a, 10b Meas: W (1)

A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82
A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	86	76	83	71	83	85	51	47	35	39	42	75	51	63
A 22	Al-22 Do you calculate values of circuit total inductance	31	29	38	26	30	26	16	11	7	8	8	21	11	13
A 23	Al-23 Do you calculate values of circuit or component inductive reactance	26	29	34	24	29	25	13	10	7	8	8	20	10	13
A 24	Al-24 Do you calculate values of circuit voltage or current in circuits containing inductors	36	38	49	30	37	35	18	15	8	8	9	26	16	15
A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	93	83	90	86	93	86	71	80	75	74	72	86	65	74
A 29	Al-29 Do you calculate values of circuit total capacitance	35	34	44	27	36	29	24	23	31	23	22	22	13	17
A 30	Al-30 Do you calculate values of circuit or component capacitive reactance	29	32	37	27	33	26	19	18	18	15	15	22	11	17
A 31	Al-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors	38	42	49	33	43	36	25	25	20	17	16	28	19	21
E 310	El-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	69	50	48	46	68	60	31	29	20	22	16	49	28	38
E 314	El-5 Do you calculate values of impedance, voltage, or current in RCL circuits	23	26	22	13	22	22	11	9	5	5	5	13	8	11

0134 III 2e. Given three questions, containing a parallel RCL circuit diagram with indicated values of applied voltage, frequency, resistance, capacitive reactance and inductive reactance, applicable formulas and three options for each question, select the option which indicates the effects on total impedance when capacitance is changed without passing through resonance IAW ST-KEP-30, Chap 2. Two of the three questions must be answered correctly. CTS: 10a Meas: W (1)

A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82
A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	86	76	83	71	83	85	51	47	35	39	42	75	51	63

D	Tsk	Task Title	303	303	304	304	304	304	304	305	455	455	455	455	455
Y	Nbr		51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B
A	22	Al-22 Do you calculate values of circuit total inductance													
A	23	Al-23 Do you calculate values of circuit or component inductive reactance													
A	24	Al-24 Do you calculate values of circuit voltage or current in circuits containing inductors													
A	27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors													
A	29	Al-29 Do you calculate values of circuit total capacitance													
A	30	Al-30 Do you calculate values of circuit or component capacitive reactance													
A	31	Al-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors													
E	310	El-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits													
E	314	El-5 Do you calculate values of impedance, voltage, or current in RCL circuits													

0135 III 2f. Given three questions, containing a parallel RCL circuit diagram with indicated values of applied voltage, frequency, resistance, capacitive reactance and inductive reactance, applicable formulas and three options for each question, select the option for each question which indicates the effects on total impedance when inductance is changed without passing through resonance IAW SI-KEP-30, Chap 2. Two of the three questions must be answered correctly.  
CIS: 10a Meas: M (1)

A	9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78
A	20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	86	76	83	71	83	85	51	47	35	39	42	75	51
A	23	Al-23 Do you calculate values of circuit or component inductive reactance	26	29	34	24	29	25	13	10	7	8	8	20	10
A	27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	93	83	90	86	93	86	71	80	75	74	72	86	65
A	30	Al-30 Do you calculate values of circuit or component capacitive reactance	29	32	37	27	33	26	19	18	15	15	22	11	17
E	310	El-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	69	56	48	46	68	60	31	29	20	22	16	49	28
E	314	El-5 Do you calculate values of impedance, voltage, or current in RCL circuits	23	26	22	13	22	22	11	9	5	5	5	13	8



D  
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Y Nbr

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

Task Title

0136 III 29. Given three questions, containing a parallel RCL circuit diagram with indicated values of applied voltage, frequency, resistance, capacitive reactance and inductive reactance, applicable formulas and three options for each question, select the option for each question which indicates the effects on total impedance when applied voltage is changed IAW ST-KEP-30, Chap 2. Two of the three questions must be answered correctly.  
CTS: 10a Meas: W (0/1)

A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82
A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	86	76	83	71	83	85	51	47	35	39	42	75	51	63
A 23	Al-23 Do you calculate values of circuit or component inductive reactance	26	29	34	24	29	25	13	10	7	8	8	20	10	13
A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	93	83	90	86	93	86	71	80	75	74	72	86	65	74
A 30	Al-30 Do you calculate values of circuit or component capacitive reactance	29	32	37	27	33	26	19	18	18	15	15	22	11	17
E 310	El-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	69	56	48	46	68	60	31	29	20	22	16	49	28	38
E 314	El-5 Do you calculate values of impedance, voltage, or current in RCL circuits	23	26	22	13	22	22	11	9	5	5	5	13	8	11

0137 III 2h. Given three questions, containing a parallel RCL circuit diagram with indicated values of applied voltage, frequency, resistance, capacitive reactance and inductive reactance, applicable formulas and three options for each question, select the option for each question which indicates the effects on total impedance when frequency is changed IAW ST-KEP-30, Chap 2. Two of the three questions must be answered correctly.  
CTS: 10a Meas: W (1)

A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82
A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	86	76	83	71	83	85	51	47	35	39	42	75	51	63
A 23	Al-23 Do you calculate values of circuit or component inductive reactance	26	29	34	24	29	25	13	10	7	8	8	20	10	13
A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	93	83	90	86	93	86	71	80	75	74	72	86	65	74
A 30	Al-30 Do you calculate values of circuit or component capacitive reactance	29	32	37	27	33	26	19	18	18	15	15	22	11	

D	T Tsk	Y Nbr	Task Title	303	303	303	304	304	304	304	304	305	455	455	455	455	455	455
				51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C	
E 310	El-1		Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	69	56	48	46	68	60	31	29	20	22	16	49	28	38	
E 314	El-5		Do you calculate values of impedance, voltage, or current in RCL circuits	23	26	22	13	22	22	11	9	5	5	5	13	8	11	

0138 III 3. Troubleshooting RCL Circuits 10/1

0139 III 3a. Given a function generator, voltmeter, and trainer with schematic diagram of a series RCL circuit to be connected, determine the resonant frequency, bandpass and bandwidth within + or - 20 percent IAW KEP-SW-31. CTS: 1a, 10b, 39 Meas: PC, W (2)

B 154	B1-2	Do you use the multimeter to measure AC voltage values	95	87	89	95	97	92	87	94	99	99	98	98	95	99
B 175	B3-4	Do you use audio sine-wave signal generators	27	20	31	64	53	75	40	23	15	4	10	63	46	38
B 183	B3-12	Do you use multi-function (square/sine/triangular) signal generators	55	47	46	26	19	24	29	31	11	5	10	37	23	18
B 188	B4-4	Do you use digital multimeters	94	83	89	95	94	91	84	94	93	91	87	94	89	92
E 310	El-1	Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	69	56	48	46	68	60	31	29	20	22	16	49	28	38

0140 III 3b. Given three questions, each with three options pertaining to troubleshooting procedures, select the option for each question that describes how to isolate a malfunction in a series RCL circuit, IAW SI-KEP-30, Chap 3. Two of three questions must be answered correctly. CTS: 7d, 8d, 10c Meas: W (1/1)

A 9	A1-9	Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82
A 10	A1-10	Do you troubleshoot circuits to isolate a faulty resistor	88	83	89	82	90	83	57	69	65	51	49	85	61	61
A 20	A1-20	Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	86	76	83	71	83	85	51	47	35	39	42	75	51	63
A 21	A1-21	Do you troubleshoot circuits to isolate a faulty inductor, choke, or choke coil	79	71	81	62	78	78	39	39	25	23	28	69	38	38
A 27	A1-27	Do you trace schematic or block diagrams of circuits containing capacitors	93	83	90	86	93	86	71	80	75	74	72	86	65	74
A 28	A1-28	Do you troubleshoot circuits to isolate a faulty capacitor	88	81	87	80	91	82	58	72	65	49	51	80	54	52
E 310	El-1	Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	69	56	48	46	68	60	31	29	20	22	16	49	28	38

D  
Task  
Y Nbr

Task Title

E 311	E1-2 Do you troubleshoot RCL circuits to circuit level components	59	50	42	40	57	54	18	24	11	9	9	44	19	21
E 312	E1-3 Do you trace schematic or block diagrams of circuits containing resonant RCL circuits	64	49	39	37	63	54	25	22	14	14	10	41	26	33
E 313	E1-4 Do you troubleshoot resonant RCL circuits to circuit level components	54	44	34	31	53	50	14	18	8	7	7	35	18	20

0141 III 3c. Given three questions, each with three options pertaining to troubleshooting procedures, select the option for each question that describes how to isolate a malfunction in a parallel RCL circuit, IAW ST-KEP-30, Chap 3. Two of three questions must be answered correctly. CTS: 7d, 8d, 10c Meas: W (1)

A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82
A 10	Al-10 Do you troubleshoot circuits to isolate a faulty resistor	88	83	89	82	90	83	57	69	65	51	49	85	61	61
A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	86	76	83	71	83	85	51	47	35	39	42	75	51	63
A 21	Al-21 Do you troubleshoot circuits to isolate a faulty inductor, choke, or choke coil	79	71	81	62	78	78	39	39	25	23	28	69	38	38
A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	93	83	90	86	93	86	71	80	75	74	72	86	65	74
A 28	Al-28 Do you troubleshoot circuits to isolate a faulty capacitor	88	81	87	80	91	82	58	72	65	49	51	80	54	52
E 310	E1-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	69	56	48	46	68	60	31	29	20	22	16	49	28	38
E 311	E1-2 Do you troubleshoot RCL circuits to circuit level components	59	50	42	40	57	54	18	24	11	9	9	44	19	21
E 312	E1-3 Do you trace schematic or block diagrams of circuits containing resonant RCL circuits	64	49	39	37	63	54	25	22	14	14	10	41	26	33
E 313	E1-4 Do you troubleshoot resonant RCL circuits to circuit level components	54	44	34	31	53	50	14	18	8	7	7	35	18	20

0142 III 3d. Given three questions each with a series RCL circuit schematic diagram with different malfunction symptoms and four options, select the option for each question that indicates the malfunction IAW ST-KEP-30, Chap 3. Two out of three must be answered correctly. CTS: 7d, 8d, 10c, Meas: W (1)

A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	94	86	90	88	93	88	70	80	78	75	78	90	78	82
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D  
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Y Nbr

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

Task Title

0144 III 3f. Given a multimeter, function generator and  
a trainer connected as a series RCL circuit with  
three separately inserted malfunctions, determine  
the malfunction IAW ST-KEP-30, Chap 3. Two of the  
three inserted malfunctions must be identified  
correctly. CTS: 5a, 5c, 5d, 7d, 8d, 10c  
Meas: PC, W (2)

A 9 A1-9 Do you trace schematic or block diagrams of circuits  
containing resistors  
A 10 A1-10 Do you troubleshoot circuits to isolate a faulty  
resistor  
A 14 A1-14 Do you ohm check resistors  
A 20 A1-20 Do you trace schematic or block diagrams of circuits  
containing inductors, chokes, or choke coils  
A 21 A1-21 Do you troubleshoot circuits to isolate a faulty  
inductor, choke, or choke coil  
A 26 A1-26 Do you ohm check inductors  
A 27 A1-27 Do you trace schematic or block diagrams of  
circuits containing capacitors  
A 28 A1-28 Do you troubleshoot circuits to isolate a faulty  
capacitor  
A 33 A1-33 Do you ohm check capacitors  
E 310 E1-1 Do you trace schematic or block diagrams of circuits  
containing resistive capacitive inductive (RCL) circuits  
E 311 E1-2 Do you troubleshoot RCL circuits to circuit level  
components  
E 312 E1-3 Do you trace schematic or block diagrams of circuits  
containing resonant RCL circuits  
E 313 E1-4 Do you troubleshoot resonant RCL circuits to  
circuit level components

0145 III 3g. Given a multimeter, function generator, and a  
trainer consisting of a connected transformer with  
three separately inserted malfunctions, determine the  
malfunction IAW ST-KEP-30, Chap 3. Two of the three  
inserted malfunctions must be identified correctly.  
CTS: 9b Meas: PC, W (2)

A 35 A1-35 Do you trace schematic or block diagrams of circuits  
containing transformers  
A 40 A1-40 Do you ohm check transformers  
A 41 A1-41 Do you measure transformer output voltage

D

T Task  
Y Nbr

Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

## 0146 III 4. Filters and Coupling

6/4

0147

III 4a. Given three questions concerning filters, each with four options, select the option for each question that describes the frequency response of a low pass filter IAW ST-KEP-30, Chap 4. Two of the three questions must be answered correctly.

CTS: 12 Meas: W

(0/2)

D 292

D2-5 Do you perform tasks on capacitive power supply filters

D 293

D2-6 Do you perform tasks on inductive power supply filters

D 294

D2-7 Do you perform tasks on L-type power supply filters

D 295

D2-8 Do you perform tasks on Pi-type power supply filters

D 296

D2-9 Do you perform tasks on T-type power supply filters

D 298

D2-11 Do you perform tasks on inductive capacitive (LC) power supply filters

E 317

E2-1 Do you trace schematic or block diagrams of circuits containing frequency sensitive filters

E 322

E2-6 Do you perform tasks on low pass frequency sensitive filters

0148

III 4b. Given three questions concerning filters, each with four options, select the option for each question that describes the frequency response of a high pass filter IAW ST-KEP-30, Chap 4. Two of the three questions must be answered correctly.

CTS: 12 Meas: W

(1)

D 292

D2-5 Do you perform tasks on capacitive power supply filters

D 293

D2-6 Do you perform tasks on inductive power supply filters

D 294

D2-7 Do you perform tasks on L-type power supply filters

D 295

D2-8 Do you perform tasks on Pi-type power supply filters

D 296

D2-9 Do you perform tasks on T-type power supply filters

D 298

D2-11 Do you perform tasks on inductive capacitive (LC) power supply filters

E 317

E2-1 Do you trace schematic or block diagrams of circuits containing frequency sensitive filters

E 323

E2-7 Do you perform tasks on high pass frequency sensitive filters

D  
T Task  
Y Nbr

Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0149 III 4c. Given three questions concerning filters,  
each with four options, select the option for each  
question that describes the frequency response of a  
bandpass filter IAW SI-KEP-30, Chap 4. Two of the  
three questions must be answered correctly.  
CTS: 12 Meas: W (1/1.5)

D 292	D2-5 Do you perform tasks on capacitive power supply filters	61	68	51	38	55	64	25	40	14	9	16	48	26	32
D 293	D2-6 Do you perform tasks on inductive power supply filters	55	60	46	31	41	58	19	21	9	9	9	43	22	26
D 294	D2-7 Do you perform tasks on L-type power supply filters	34	42	31	23	25	52	12	12	4	4	8	39	22	24
D 295	D2-8 Do you perform tasks on Pi-type power supply filters	31	45	32	26	29	54	14	11	2	4	5	35	20	24
D 296	D2-9 Do you perform tasks on T-type power supply filters	31	26	27	23	22	40	13	9	2	4	5	27	18	20
D 298	D2-11 Do you perform tasks on inductive capacitive (LC) power supply filters	56	59	45	30	49	58	19	22	9	10	10	44	22	24
E 317	E2-1 Do you trace schematic or block diagrams of circuits containing frequency sensitive filters	64	52	41	50	59	64	45	16	9	12	8	46	32	36
E 324	E2-8 Do you perform tasks on band pass frequency sensitive filters	68	51	44	55	66	63	46	13	10	6	3	48	32	30

0150 III 4d. Given three questions concerning filters,  
each with four options, select the option for each  
question that describes the frequency response of a  
band reject filter IAW SI-KEP-30, Chap 4. Two of the  
three questions must be answered correctly.  
CTS: 12 Meas: W (0/1.5)

D 292	D2-5 Do you perform tasks on capacitive power supply filters	61	68	51	38	55	64	25	40	14	9	16	48	26	32
D 293	D2-6 Do you perform tasks on inductive power supply filters	55	60	46	31	41	58	19	21	9	9	9	43	22	26
D 294	D2-7 Do you perform tasks on L-type power supply filters	34	42	31	23	25	52	12	12	4	4	8	39	22	24
D 295	D2-8 Do you perform tasks on Pi-type power supply filters	31	45	32	26	29	54	14	11	2	4	5	35	20	24
D 296	D2-9 Do you perform tasks on T-type power supply filters	31	26	27	23	22	40	13	9	2	4	5	27	18	20
D 298	D2-11 Do you perform tasks on inductive capacitive (LC) power supply filters	56	59	45	30	49	58	19	22	9	10	10	44	22	24
E 317	E2-1 Do you trace schematic or block diagrams of circuits containing frequency sensitive filters	64	52	41	50	59	64	45	16	9	12	8	46	32	36
E 325	E2-9 Do you perform tasks on band-reject frequency sensitive filters	45	29	25	45	44	42	32	7	4	2	3	30	16	14

D  
T Task  
Y Nbr

Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0151 III 4e. Given a schematic diagram of a direct coupled (DC) circuit and three questions with four options each, select the option for each question that describes the frequency response of DC coupling IAW ST-KEP-30, Chap 4. Two of the three questions must be answered correctly. CIS: 13 Meas: W (1)

C 226 C3-2 Do you trace schematic diagrams of coupling circuits  
C 229 C3-5 Do you perform tasks on direct coupling circuits

68 62 54 42 64 71 26 33 18 18 18 54 36 39  
64 52 45 40 58 68 25 29 15 14 13 51 35 32

0152 III 4f. Given a schematic diagram of a resistor-capacitor (RC) coupled circuit and three questions with four options each, select the option for each question that describes the frequency response of RC coupling IAW ST-KEP-30, Chap 4. Two of the three questions must be answered correctly. CIS: 13 Meas: W (1)

C 226 C3-2 Do you trace schematic diagrams of coupling circuits  
C 230 C3-6 Do you perform tasks on capacitive-resistive coupling circuits

68 62 54 42 64 71 26 33 18 18 18 54 36 39  
55 50 42 33 50 59 17 24 11 13 11 45 28 29

0153 III 4g. Given a schematic diagram of an inductor-capacitor (LC) coupled circuit and three questions with four options each, select the option for each question that describes the frequency response of L-C coupling IAW ST-KEP-30, Chap 4. Two out of the three questions must be answered correctly. CIS: 13 Meas: W (1)

C 226 C3-2 Do you trace schematic diagrams of coupling circuits  
C 231 C3-7 Do you perform tasks on capacitive-inductive coupling circuits

68 62 54 42 64 71 26 33 18 18 18 54 36 39  
51 50 36 33 53 59 17 17 8 8 9 44 26 28

0154 III 4h. Given a schematic diagram of a transformer coupled circuit and three questions with four options each, select the option for each question that describes the frequency response of transformer coupling IAW ST-KEP-30, Chap 4. Two of the three questions must be answered correctly. CIS: 13 Meas: W (1)

A 35 A1-35 Do you trace schematic or block diagrams of circuits containing transformers

91 82 89 82 91 86 66 71 64 76 69 84 65 72



D	T	Y	Tsk	Nbr
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Task Title

303 303 303 304 304 304 305 455 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C  
65 60 47 39 53 65 17 23 12 11 12 50 31 30

**C 232 C3-6 Do you perform tasks on transformer coupling circuits**

0155 POI E3AQR30020 009 ELECTRONIC PRINCIPLES  
Volume 2 of 4 Volumes

## 0156 IV. Solid State Devices and Applications

## 0157 IV 1. Diodes and Power Supplies

12/4

0158 IV 1a. Describe the conduction characteristics of a PN Junction Diode. CTS: 17 Meas: W (0/2)

A 86 A3-4 Do you use diode characteristic curves

26 21 23 15 22 24 9 20 6 7 5 18 10 6

0159 IV 1b. Identify the function of each section of a typical power supply block diagram. CTS: 21a, 21e, 21g Meas: W ( 5/0)

**A 35 A1-35 Do you trace schematic or block diagrams of circuits containing transformers**

D 275	Do you trace block diagrams of circuits containing power supplies	93	84	84	85	91	85	79	83	62	66	70	77	58	76
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**D 288** Do you trace block diagrams of circuits containing power supplies power supply filters

0160 IV 1c. Describe the operation of an unfiltered half-wave rectifier. CTS: 21a Meas: W (2/0)

**D 276 D1-2 Do you trace schematic diagrams of power supply circuits**

	73	71	66	50	68	62	33	46	18	16	15	56	31	34
D 280	D1-6 Do you perform tasks on half-wave rectifier power supplies													

D	Tsk	Task Title	303	303	304	304	304	304	305	455	455	455	455	455	455
Y	Nbr		51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B X2C

0161 IV 1d. Describe the operation of an unfiltered full-wave rectifier. CTS: 21b Meas: W (2/0)

D 276	D1-2 Do you trace schematic diagrams of power supply circuits	90	83	84	80	92	83	67	78	51	54	59	74	49	66
D 281	D1-7 Do you perform tasks on full-wave rectifier power supplies	79	77	74	56	74	70	38	52	21	19	17	62	32	37

0162 IV 1e. Describe the operation of an unfiltered full-wave bridge rectifier. CTS: 21c Meas: W (1.5/0)

D 276	D1-2 Do you trace schematic diagrams of power supply circuits	90	83	84	80	92	83	67	78	51	54	59	74	49	66
D 282	D1-8 Do you perform tasks on full-wave bridge rectifier power supplies	76	76	74	57	73	73	42	52	24	18	18	64	34	38

0163 IV 1f. Describe the effect filtering has on the output voltages and waveforms for selected rectifier circuits. CTS: 21a, 21b, 21c, 21g Meas: W (0/2)

D 276	D1-2 Do you trace schematic diagrams of power supply circuits	90	83	84	80	92	83	67	78	51	54	59	74	49	66
D 280	D1-6 Do you perform tasks on half-wave rectifier power supplies	73	71	66	50	68	62	33	46	18	16	15	56	31	34
D 281	D1-7 Do you perform tasks on full-wave rectifier power supplies	79	77	74	56	74	70	38	52	21	19	17	62	32	37
D 282	D1-8 Do you perform tasks on full-wave bridge rectifier power supplies	76	76	74	57	73	73	42	52	24	18	18	64	34	38
D 289	D2-2 Do you trace schematic diagrams of power supply filters	66	72	60	43	62	68	30	46	17	14	23	52	28	37
D 292	D2-5 Do you perform tasks on capacitive power supply filters	61	68	51	38	55	64	25	40	14	9	16	48	26	32

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## Task Title

303 303 303 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0164

IV 1g. Given an NIDA Trainer, appropriate printed circuit cards, an oscilloscope and a multimeter, determine the effect upon rectifier output voltages and waveforms as circuit parameters are changed. No Type I, and no more than two Type II errors allowed.  
CTS: 21a(1), 21b, 21b(1), 21c(1), 21g, 21g(1)  
Meas: PC, W (3/0)

B 153

B1-1 Do you use the multimeter to measure DC voltage values

B 154

B1-2 Do you use the multimeter to measure AC voltage values

B 165

B2-5 Do you use the oscilloscope to measure ripple voltages

D 276

D1-2 Do you trace schematic diagrams of power supply circuits

D 289

D2-2 Do you trace schematic diagrams of power supply filters

D 292

D2-5 Do you perform tasks on capacitive power supply filters

0165

IV 1h. Describe the operation of an unfiltered three-phase rectifier. CTS: 21d Meas: W (1.5/0)

A 42

A1-62 Do you trace schematic or block diagrams of circuits containing three phase transformers

D 283

D1-9 Do you perform tasks on three-phase rectifier power supplies

0166

IV 1i. Describe the operation of a voltage doubler. CTS: 21f Meas: W (1.5/0)

D 284

D1-10 Do you perform tasks on voltage multipliers (doubblers/triplers)

0167

IV 2. Transistors

8/3

0168

74 2a. Describe the physical characteristics of a bipolar transistor. CTS: 18a Meas: W (0/2)

A 89

A3-7 Do you trace schematic or block diagrams of circuits containing transistors

93 77 73 89 94 85 68 79 53 54 58 82 55 70

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Task Title

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51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0169 IV 2b. Describe the biasing requirements of NPN/PNP bipolar transistors. CTS: 18a Meas: W (4/0)

A 89 A3-7 Do you trace schematic or block diagrams of circuits containing transistors 93 77 73 89 94 85 68 79 53 54 58 82 55 70

0170 IV 2c. Describe basic transistor configurations. CTS: 18a Meas: W (2/1)

A 89 A3-7 Do you trace schematic or block diagrams of circuits containing transistors 93 77 73 89 94 85 68 79 53 54 58 82 55 70  
C 200 C1-2 Do you trace schematic diagrams of transistor amplifier circuits 85 69 59 70 81 79 47 49 25 27 69 40 49

0171 IV 2d. Given an NIDA Trainer, appropriate printed circuit card, and a multimeter, determine the effect that changes in forward bias have on transistor static operation. No Type I, and no more than two Type II errors are allowed. CTS: 18a, 18b Meas: PC, W (2/0)

A 89 A3-7 Do you trace schematic or block diagrams of circuits containing transistors 93 77 73 89 94 85 68 79 53 54 58 82 55 70  
A 91 A3-9 Do you check transistors using an ohmmeter 87 73 68 80 84 79 50 71 33 26 30 75 39 47  
C 200 C1-2 Do you trace schematic diagrams of transistor amplifier circuits 85 69 59 70 81 79 47 49 25 27 69 40 49

0172 IV 3. Amplifiers 17.5/8

0173 IV 3a. Describe how amplification is accomplished in transistor circuits. CTS: 19a Meas: W (1/1)

A 89 A3-7 Do you trace schematic or block diagrams of circuits containing transistors 93 77 73 89 94 85 68 79 53 54 58 82 55 70  
C 200 C1-2 Do you trace schematic diagrams of transistor amplifier circuits 85 69 59 70 81 79 47 49 25 27 69 40 49

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## Task Title

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51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0174

IV 3b. Describe the effect that an input signal has  
on the operation of transistor amplifiers. CTS: 19a  
Meas: W

(3/1)

A 89

A3-7 Do you trace schematic or block diagrams of circuits  
containing transistors

A 93

A3-11 Do you use transistor characteristic curves

C 200

C1-2 Do you trace schematic diagrams of transistor  
amplifier circuits93 77 73 89 94 85 68 79 53 54 58 82 55 70  
22 20 15 14 17 24 8 19 5 4 3 15 6 7  
85 69 59 70 81 79 47 49 25 27 69 40 49

0175

IV 3c. Given an NIDA Trainer, appropriate printed circuit  
card, a function generator, a multimeter, and an  
oscilloscope, compare static and dynamic operation of  
a common emitter amplifier. No Type I, and no more than  
two Type II errors are allowed. CTS: 18a, 19a, 19b  
Meas: PC, W

(2/0)

A 89

A3-7 Do you trace schematic or block diagrams of circuits  
containing transistors

C 200

C1-2 Do you trace schematic diagrams of transistor  
amplifier circuits93 77 73 89 94 85 68 79 53 54 58 82 55 70  
85 69 59 70 81 79 47 49 25 27 69 40 49

0176

IV 3d. Describe the effect on voltage gain when changes  
are made in the ohmic values of the biasing network  
and the lead resistance. CTS: 19a Meas: PC

(2/1)

A 89

A3-7 Do you trace schematic or block diagrams of circuits  
containing transistors

C 200

C1-2 Do you trace schematic diagrams of transistor  
amplifier circuits

C 205

C1-7 Do you measure transistor amplifier voltage, current,  
or power gain93 77 73 89 94 85 68 79 53 54 58 82 55 70  
85 69 59 70 81 79 47 49 25 27 69 40 49  
60 53 41 59 51 61 37 31 12 9 9 49 26 30

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303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

Task Title

0177 IV 3e. Given an NIDA Trainer, appropriate printed circuit card, a multimeter an oscilloscope and a function generator, determine the effect on transistor circuit operation when selected circuit changes are made to alter amplifier gain. No Type I, and no more than two Type II errors are allowed. CTS: 18a, 19b Meas: PC, W (2/1)

A 89	A3-7 Do you trace schematic or block diagrams of circuits containing transistors	93	77	73	89	94	85	68	79	53	54	58	82	55	70
A 91	A3-9 Do you check transistors using an ohmmeter	87	73	68	80	84	79	50	71	33	26	30	75	39	47
C 200	C1-2 Do you trace schematic diagrams of transistor amplifier circuits	85	69	59	70	81	79	47	49	25	27	27	69	40	49
C 205	C1-7 Do you measure transistor amplifier voltage, current, or power gain	60	53	41	59	51	61	37	31	12	9	9	49	26	30
C 206	C1-8 Do you calculate values of transistor amplifier voltage, current or power gain	33	29	26	28	30	32	19	14	3	4	3	23	10	14

0178 IV 3f. Describe the effect on voltage gain when changes are made in emitter circuit components. CTS: 19a  
Meas: W (0/1.5)

A 87	A3-5 Do you use diode substitution information	45	40	39	30	33	51	16	35	13	11	12	28	20	21
C 200	C1-2 Do you trace schematic diagrams of transistor amplifier circuits	85	69	59	70	81	79	47	49	25	27	27	69	40	49
C 205	C1-7 Do you measure transistor amplifier voltage, current, or power gain	60	53	41	59	51	61	37	31	12	9	9	49	26	30
C 206	C1-8 Do you calculate values of transistor amplifier voltage, current or power gain	33	29	26	28	30	32	19	14	3	4	3	23	10	14
C 220	C2-3 Do you perform tasks on emitter (swamping) resistor stabilization amplifiers	53	37	20	29	29	53	16	23	8	8	6	45	24	26
C 221	C2-4 Do you perform tasks on self-bias stabilization amplifiers	35	22	18	24	25	46	13	12	6	8	7	30	17	17

0179 IV 3g. Given an NIDA Trainer, appropriate printed circuit card, and oscilloscope, and a function generator, determine the effect on transistor operation when an emitter bias stabilization circuit is added. No Type I, and no more than two Type II errors are allowed. CTS: 18a, 19a, 19b Meas: PC, W (1.5/0)

A 89	A3-7 Do you trace schematic or block diagrams of circuits containing transistors	93	77	73	89	94	85	68	79	53	54	58	82	55	70
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D T Y	Task Title	303	303	303	304	304	304	304	305	455	455	455	455	455
Nbr		51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B X2C
C 200	C1-2 Do you trace schematic diagrams of transistor amplifier circuits	85	69	59	70	81	79	47	49	25	27	27	69	40 49
C 205	C1-7 Do you measure transistor amplifier voltage, current, or power gain	60	53	41	59	51	61	37	31	12	9	9	49	26 30
C 206	C1-8 Do you calculate values of transistor amplifier voltage, current or power gain	33	29	26	28	30	32	19	14	3	4	3	23	10 14
C 220	C2-3 Do you perform tasks on emitter (swamping) resistor stabilization amplifiers	53	37	20	29	29	53	16	23	8	8	6	45	24 26
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0180	IV 3h. Describe methods used to provide temperature stabilization for a common emitter amplifier. CTS: 19a Meas: W (2/.5)													
A 89	A3-7 Do you trace schematic or block diagrams of circuits containing transistors	93	77	73	89	94	85	68	79	53	54	58	82	55 70
C 219	C2-2 Do you troubleshoot amplifier stabilization circuits to circuit level components	47	41	21	25	36	51	12	19	5	8	5	33	21 22
C 220	C2-3 Do you perform tasks on emitter (swamping) resistor stabilization amplifiers	53	37	20	29	29	53	16	23	8	8	6	45	24 26
C 221	C2-4 Do you perform tasks on self-bias stabilization amplifiers	35	22	18	24	25	46	13	12	6	8	7	30	17 17
C 222	C2-5 Do you perform tasks on thermistor stabilization amplifiers	51	29	19	22	35	45	16	17	10	7	8	41	23 24
C 223	C2-6 Do you perform tasks on diode stabilization amplifiers	53	39	26	27	38	47	17	24	10	10	8	42	24 28
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0181	IV 3i. Determine how class of operation effects the conduction characteristics of an amplifier. CTS: 19a Meas: W (2.5/.5)													
A 89	A3-7 Do you trace schematic or block diagrams of circuits containing transistors	93	77	73	89	94	85	68	79	53	54	58	82	55 70
C 200	C1-2 Do you trace schematic diagrams of transistor amplifier circuits	85	69	59	70	81	79	47	49	25	27	27	69	40 49
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0182	IV 3j. Describe how push-pull amplifiers operate according to class of operation. CTS: 19d Meas: W (.5/1.5)													
A 89	A3-7 Do you trace schematic or block diagrams of circuits containing transistors	93	77	73	89	94	85	68	79	53	54	58	82	55 70
C 200	C1-2 Do you trace schematic diagrams of transistor amplifier circuits	85	69	59	70	81	79	47	49	25	27	27	69	40 49
C 210	C1-12 Do you work on push-pull transistor amplifiers	69	55	45	46	60	70	19	29	12	10	15	60	31 34

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Task Title

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51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C0183 IV 3k. Describe how the two-stage paraphase amplifier  
produces two signals 180 degrees out of phase.

CTS: 19d Meas: W (.5/.5)

A 89 A3-7 Do you trace schematic or block diagrams of circuits 93 77 73 89 94 85 68 79 53 54 58 82 55 70  
containing transistors

C 200 C1-2 Do you trace schematic diagrams of transistor 85 69 59 70 81 79 47 49 25 27 27 69 40 49  
amplifier circuits

C 209 C1-11 Do you work on paraphase transistor amplifiers 13 15 15 9 8 26 5 3 1 2 5 21 14 10

0184 IV 3l. describe how the complementary-symmetry  
push-pull amplifier produces an output. CTS: 19d  
Meas: W (.5/.5)

A 89 A3-7 Do you trace schematic or block diagrams of circuits 93 77 73 89 94 85 68 79 53 54 58 82 55 70  
containing transistors

C 200 C1-2 Do you trace schematic diagrams of transistor 85 69 59 70 81 79 47 49 25 27 27 69 40 49  
amplifier circuits

C 216 C1-18 Do you work on complementary symmetry transistor 36 14 13 15 13 34 7 7 2 6 3 22 15 17  
amplifiers

0185 IV 4. Voltage Amplifier Troubleshooting 5.5/1.0

0186 IV 4a. Determine the malfunction in a common emitter  
amplifier circuit when a symptom is indicated. CTS:  
18b, 19c Meas: W (2.5/1)

A 89 A3-7 Do you trace schematic or block diagrams of circuits 93 77 73 89 94 85 68 79 53 54 58 82 55 70  
containing transistors

C 200 C1-2 Do you trace schematic diagrams of transistor 85 69 59 70 81 79 47 49 25 27 27 69 40 49  
amplifier circuits

C 202 C1-4 Do you troubleshoot transistor amplifiers to circuit 71 64 52 61 70 74 25 42 10 9 11 56 27 32  
level components

C 203 C1-5 Do you troubleshoot transistor amplifier distortion 47 36 28 35 44 55 17 21 5 4 5 37 18 22



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Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0187 IV 4b. Given an NIDA Trainer, appropriate printed circuit card, a function generator, and a list of normal amplifier conditions, use a multimeter and an oscilloscope to isolate a malfunction in a typical transistor audio amplifier circuit. No type I, and no more than two Type II errors are allowed.  
CTS: 18b, 19c Meas: PC, W (3/0)

A 89 A3-7 Do you trace schematic or block diagrams of circuits containing transistors  
A 90 A3-8 Do you troubleshoot circuits to isolate a faulty transistor  
C 200 C1-2 Do you trace schematic diagrams of transistor amplifier circuits  
C 202 C1-4 Do you troubleshoot transistor amplifiers to circuit level components  
C 203 C1-5 Do you troubleshoot transistor amplifier distortion  
C 219 C2-2 Do you troubleshoot amplifier stabilization circuits to circuit level components  
C 227 C3-3 Do you troubleshoot circuits to isolate a faulty coupling circuit  
C 228 C3-4 Do you troubleshoot coupling circuits to circuit level components

0188 IV 5. Voltage Regulation

4.5/0

0189 IV 5a. Explain how a shunt voltage regulator circuit compensates for external circuit changes.  
CTS: 20a, 21e Meas: W (1/0)

A 104 A3-22 Do you perform tasks on zener diodes  
D 300 D3-2 Do you trace schematic diagrams of power supply voltage regulator circuits  
D 304 D3-6 Do you perform tasks on zener diode power supply voltage regulators

Keesler CETP AFSCs matched to Keesler EP POI (1 / 2) PH0039

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51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

Task Title

0190 IV 5b. Describe how the series electronic voltage regulator (EVR) circuit responds to changes in the output voltage adjustment. CTS: 20a, 21e  
Meas: W (1.5/0)

D 300 D3-2 Do you trace schematic diagrams of power supply voltage regulator circuits 82 79 80 67 82 77 45 60 22 21 24 60 34 38  
D 305 D3-7 Do you perform tasks on transistor series power supply voltage regulators 65 58 40 48 59 62 23 37 6 8 7 40 25 28

0191 IV 5c. Given NIDA Trainer, appropriate printed circuit cards, use a multimeter to observe the effect on voltages across selected components in an Electronic Voltage Regulator when circuit parameters are changed. No Type I, and no more than two Type II errors are allowed. CTS: 20a, 21e, 21e(1) Meas: PC, W (2/0)

D 300 D3-2 Do you trace schematic diagrams of power supply voltage regulator circuits 82 79 80 67 82 77 45 60 22 21 24 60 34 38  
D 305 D3-7 Do you perform tasks on transistor series power supply voltage regulators 65 58 40 48 59 62 23 37 6 8 7 40 25 28

0192 IV 6. Selected Solid State Devices 4.5/2.0

0193 IV 6a. Determine selected tunnel diode operational conditions from a characteristic curve. CTS: 20b  
Meas: W (.5/0)

A 101 A3-19 Do you perform tasks on tunnel diodes 36 27 15 49 38 39 29 10 2 4 2 14 8 6

0194 IV 6b. Explain how the conduction of an N-channel Junction Field Effect Transistor (JFET) is affected by various levels of input signal. CTS: 20g  
Meas: W (0/1)

A 102 A3-20 Do you perform tasks on field effect transistors (FET) 77 50 50 40 58 65 46 41 8 8 6 32 22 25

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Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0195 IV 6c. Determine how the conduction of a Metal Oxide  
Semi-Conductor Field Effect Transistor (MOSFET) is  
affected by various levels of input signal.

(0/1)

CTS: 20g Meas: W

A 102 A3-20 Do you perform tasks on field effect transistors (FET) 77 50 50 40 58 65 46 41 8 8 6 32 22 25

0196 IV 6d. Determine the operational condition of a  
Silicon Controlled Rectifier (SCR) from selected  
points on a characteristic curve. CTS: 20h

(.5/0)

Meas: W

A 109 A3-27 Do you perform tasks on silicon controlled rectifiers  
(SCR) 79 59 59 51 58 54 45 48 7 7 5 27 18 14

0197 IV 6e. Describe the input/output characteristics of  
the operational amplifier (OP-AMP) when used in  
various modes of operation. CTS: 19g, 20e

(1/0)

Meas: W

C 251 C5-3 Do you calculate op amp gain  
C 253 C5-5 Do you use or apply operational amplifiers for  
general purpose (inverting or non-inverting)  
C 254 C5-6 Do you use or apply operational amplifiers as  
differential/comparators  
C 255 C5-7 Do you use or apply operational amplifiers for  
summing  
C 256 C5-8 Do you use or apply operational amplifiers for  
unity gain amplifier (buffer)  
C 257 C5-9 Do you use or apply operational amplifiers as  
active filters

24 24 36 18 23 22 17 15 4 3 4 8 5 6  
73 57 52 33 63 52 21 41 9 12 13 23 18 15  
66 45 47 28 56 41 19 30 9 9 8 20 13 9  
66 45 46 15 40 28 16 21 10 13 15 11 8 6  
49 41 40 25 51 37 16 18 10 6 10 13 10 7  
31 17 19 21 37 23 17 14 5 7 7 10 9 5

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Task Title

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51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0198 IV 6f. Given an NIDA Trainer, appropriate printed circuit card, a function generator, a multimeter, and an oscilloscope, determine the input/output characteristics of an Operational Amplifier (OP-AMP) used to perform SUM and DIFFERENCE functions. No Type I, and no more than two Type II errors are allowed.  
CTS: 19g, 19h, 20e Meas: PC, W (1/0)

C 251 C5-3 Do you calculate op amp gain  
C 253 C5-5 Do you use or apply operational amplifiers for general purpose (inverting or non-inverting)  
C 254 C5-6 Do you use or apply operational amplifiers as differential/comparators  
C 255 C5-7 Do you use or apply operational amplifiers for summing  
C 256 C5-8 Do you use or apply operational amplifiers for unity gain amplifier (buffer)  
C 257 C5-9 Do you use or apply operational amplifiers as active filters

24 24 36 18 23 22 17 15 4 3 4 8 5 6  
73 57 52 33 63 52 21 41 9 12 13 23 18 15  
66 45 47 28 56 41 19 30 9 9 8 20 13 9  
66 45 46 15 40 28 16 21 10 13 15 11 8 6  
49 41 40 25 51 37 16 18 10 6 10 13 10 7  
31 17 19 21 37 23 17 14 5 7 7 10 9 5

0199 IV 6g. Explain the effect of light variations on the conduction characteristics of a Photo-Conductive Diode. CTS: 20c Meas: W (.5/0)

J 682 J2-2 Do you trace schematic diagrams of photosensitive device circuits  
J 685 J2-5 Do you work on photodiodes  
J 689 J2-9 Do you work on photocells (Photoconductive or Photovoltaic)

44 19 22 9 5 22 12 32 4 1 1 7 5 2  
15 9 10 3 2 13 4 26 2 1 0 3 1 1  
14 9 13 4 5 14 8 18 2 1 0 2 1 1

0200 IV 6h. Explain the purpose of the light-emitting diode (LED). CTS: 20f Meas: W (.5/0)

A 107 A3-25 Do you perform tasks on light emitting diodes (LED) 75 61 46 57 65 67 56 59 17 25 16 44 33 25

0201 IV 6i. Describe the operational characteristics of a Varactor that allows it to be used as a variable capacitor. CTS: 20d Meas: W (.5/0)

A 100 A3-18 Do you perform tasks on varactors/varicaps 63 25 27 41 39 57 38 22 2 4 3 33 22 21

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Task Title

303 303 303 304 304 304 305 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0202 V. Wave Generation and Shaping and Soldering Techniques

0203 V 1. Sinusoidal Oscillators

9/3

0204 V 1a. Given three questions, each with three options, select the option in each question that states the three requirements for sustaining oscillation IAW ST-KEP-50, Chap 1. Two of the three must be answered correctly.  
CTS: 22a Meas: W (0/.5)

F 328 F1-2 Do you trace schematic diagrams of oscillator circuits 83 75 69 60 84 69 45 47 11 8 7 56 34 43  
F 332 F1-6 Do the oscillators you work with use LC tank circuits 65 52 47 33 65 57 21 22 8 7 5 51 30 29

0205 V 1b. Given a schematic diagram of a Series-Fed Hartley oscillator and a list of five circuit components with statements concerning the purpose of each, match each component to its purpose IAW ST-KEP-50, Chap 1. Three of the five must be matched correctly. CTS: 22a Meas: W (.5/.5)

F 328 F1-2 Do you trace schematic diagrams of oscillator circuits 83 75 69 60 84 69 45 47 11 8 7 56 34 43  
F 332 F1-6 Do the oscillators you work with use LC tank circuits 65 52 47 33 65 57 21 22 8 7 5 51 30 29  
F 336 F1-10 Do you perform tasks on series Hartley oscillator circuits 51 45 23 18 55 42 10 17 3 3 3 36 19 20

0206 V 1c. Given a schematic diagram of a Series-Fed Hartley Oscillator and three questions with four options each, select the option for each question that describes how the output frequency signal is derived internally IAW ST-KEP-50, Chap 1. Two of the three questions must be answered correctly. CTS: 22a Meas: W (2/0)

F 328 F1-2 Do you trace schematic diagrams of oscillator circuits 83 75 69 60 84 69 45 47 11 8 7 56 34 43  
F 332 F1-6 Do the oscillators you work with use LC tank circuits 65 52 47 33 65 57 21 22 8 7 5 51 30 29  
F 336 F1-10 Do you perform tasks on series Hartley oscillator circuits 51 45 23 18 55 42 10 17 3 3 3 36 19 20

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Task Title

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51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0207 V 1d. Given a schematic diagram of a voltage-tuned oscillator and three questions with three options each, select the option for each question that describes how the output frequency is derived from the input DC control voltage IAW ST-KEP-50, Chap 1. Two out of the three questions must be answered correctly. CTS: 22a Meas: W (2.5/0)

F 328 F1-2 Do you trace schematic diagrams of oscillator circuits  
F 332 F1-6 Do the oscillators you work with use LC tank circuits  
F 340 F1-14 Do you perform tasks on voltage control oscillators (VCO/VTD)

83 75 69 60 84 69 45 47 11 8 7 56 34 43  
65 52 47 33 65 57 21 22 8 7 5 51 30 29  
61 27 27 50 29 51 44 19 1 1 2 39 22 22

0208 V 1e. Given a schematic diagram of a crystal oscillator and a list of five circuit components with statements concerning component purpose, match each component to its purpose IAW ST-KEP-50, Chap 1. Three of the five must be matched correctly. CTS: 22c Meas: W (1/0)

F 328 F1-2 Do you trace schematic diagrams of oscillator circuits  
F 332 F1-6 Do the oscillators you work with use LC tank circuits  
F 334 F1-8 Do the oscillators you work with use crystals  
F 341 F1-15 Do you perform tasks on crystal oscillator circuits

83 75 69 60 84 69 45 47 11 8 7 56 34 43  
65 52 47 33 65 57 21 22 8 7 5 51 30 29  
85 73 64 62 82 62 45 42 9 5 3 57 39 36  
78 66 50 57 75 55 41 36 8 4 3 49 26 32

0209 V 1f. Given a schematic diagram of a crystal oscillator and three questions with four options each, select the option for each question that describes how the output frequency signal is derived IAW ST-KEP-50, Chap 1. Two of the three questions must be answered correctly. CTS: 22c Meas: W (0/2)

F 328 F1-2 Do you trace schematic diagrams of oscillator circuits  
F 332 F1-6 Do the oscillators you work with use LC tank circuits  
F 341 F1-15 Do you perform tasks on crystal oscillator circuits

83 75 69 60 84 69 45 47 11 8 7 56 34 43  
65 52 47 33 65 57 21 22 8 7 5 51 30 29  
78 66 50 57 75 55 41 36 8 4 3 49 26 32

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## Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0210 V lg. Given a schematic diagram of an RC oscillator, a list of four circuit components and a list of statements identifying component purpose, match each component to its purpose IAW ST-KEP-50, Chap 1. Three of the four must be matched correctly.  
CTS: 22b Meas: W (1/0)

F 328 F1-2 Do you trace schematic diagrams of oscillator circuits  
F 333 F1-7 Do the oscillators you work with use RC networks  
F 346 F1-20 Do you perform tasks on RC phase shift oscillators

83 75 69 60 84 69 45 47 11 8 7 56 34 43  
59 54 51 35 66 54 16 27 8 7 5 52 30 28  
31 20 17 13 40 23 13 8 1 1 2 23 11 11

0211 V lh. Given a schematic diagram of an RC oscillator and three questions with four options each, select the option for each question that describes how the output frequency signal is derived IAW ST-KEP-50, Chap 1. Two out of three questions must be answered correctly. CTS: 22b Meas: W (2/0)

F 328 F1-2 Do you trace schematic diagrams of oscillator circuits  
F 333 F1-7 Do the oscillators you work with use RC networks  
F 346 F1-20 Do you perform tasks on RC phase shift oscillators

83 75 69 60 84 69 45 47 11 8 7 56 34 43  
59 54 51 35 66 54 16 27 8 7 5 52 30 28  
31 20 17 13 40 23 13 8 1 1 2 23 11 11

0212 V 2. Frequency Synthesizer (4/2)

0213 V 2a. Given the functional block diagram of a frequency synthesizer, a list of the four stages and statements which identify the purpose of each stage, match each stage to its purpose IAW ST-KEP-50, Chap 2. Three of the four must be matched correctly. CTS: 22a Meas: W (2/0)

F 327 F1-1 Do you trace block diagrams of circuits containing oscillators  
F 335 F1-9 Do the oscillators you work with use phase lock loops (PLL)

86 74 69 66 84 71 56 51 12 11 10 60 38 53  
47 20 20 45 35 60 50 21 1 1 2 18 17 15

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Task Title

303	303	303	304	304	304	305	455	455	455	455	455	455
51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B X2C

0214 V 2b. Given a schematic diagram of a buffer amplifier and three questions with four options each, select the option for each question that states the purpose of a buffer amplifier IAW ST-REP-50, Chap 2. Two out of the three must be answered correctly. CIS: 22d  
Meas: W

C 215	C1-17	Do you work on buffer transistor amplifiers	68	58	44	51	69	66	34	22	15	12	13	40	27	21
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0215 V 2c. Given a schematic diagram of an RF amplifier and three questions with four options each, select the option for each question that describes the RF amplifier characteristics when operating at resonance IAW ST-KLEP-50, Chap 2. Two out of the three questions must be answered correctly. CTS: 19f Mess: W (1/0)

C 214 C1-16 Do you work on RF transistor amplifiers

0216 V 2d. Given three questions, each with the schematic diagram of a frequency multiplier having input and output frequencies indicated and three options, select the option in each question that states the type of frequency multiplier IAW ST-KEP-50, Chap 2. Two of the three must be answered correctly.  
CTS: 22f Meas: W (0/2)

C 214	C1-16	Do you work on RF transistor amplifiers	77	51	38	60	76	76	53	10	4	5	6	64	39	47
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0217 V 3. Multivibrators and Sawtooth Generator (10.5/2)



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Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0218 V 3a. Given three questions, each containing a schematic diagram of a DC series RC circuit with indicated resistance and capacitance values, applicable formula, and four options, select the option for each question that states the time constant for the circuit IAW ST-KEP-50, Chap 3. Two out of three questions must be answered correctly.  
CTS: 11 Meas: W

(.5/0)

F 366 F3-8 Do you perform tasks on RC differentiating WSC  
F 368 F3-10 Do you perform tasks on RC integrating WSC

51 42 36 14 49 20 9 14 0 4 3 17 16 9  
43 29 31 12 31 17 8 14 0 5 2 13 11 7

0219 V 3b. Given three questions, each containing a schematic diagram of a DC series RC Circuit, indicated time constant, time allowed, applicable formula, and four options, select the option for each question that states the number of time constants for the circuit IAW ST-KEP-50, Chap 3. Two of the three questions must be answered correctly.  
CTS: 11 Meas: W

(.5/0)

F 366 F3-8 Do you perform tasks on RC differentiating WSC  
F 368 F3-10 Do you perform tasks on RC integrating WSC

51 42 36 14 49 20 9 14 0 4 3 17 16 9  
43 29 31 12 31 17 8 14 0 5 2 13 11 7

0220 V 3c. Given three questions, each containing a schematic diagram of a DC series RC Circuit with applied voltage, number of time constants, universal time constant chart, applicable formulas, and four options, select the resistor in the circuit IAW ST-KEP-50, Chap 3. Two out of three questions must be answered correctly. CTS: 11 Meas: W

(.5/0)

F 366 F3-8 Do you perform tasks on RC differentiating WSC  
F 368 F3-10 Do you perform tasks on RC integrating WSC

51 42 36 14 49 20 9 14 0 4 3 17 16 9  
43 29 31 12 31 17 8 14 0 5 2 13 11 7

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 Y Nbr Task Title  
 303 303 303 304 304 304 305 455 455 455 455 455 455  
 51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0221 V 3d. Given three questions, each containing a schematic diagram of a DC series RC circuit with applied voltage, number of time constants, universal time constant chart, applicable formulas, and four options, select the option for each question that states the voltage developed across the capacitor in the circuits IAW ST-KEP-50, Chap 3. Two out of the three questions must be answered correctly.  
 CTS: 11 Meas: W (.5/0)

F 366 F3-8 Do you perform tasks on RC differentiating WSC  
 F 368 F3-10 Do you perform tasks on RC integrating WSC

51 42 36 14 49 20 9 14 0 4 3 17 16 9  
 43 29 31 12 31 17 8 14 0 5 2 13 11 7

0222 V 3e. Given three questions, each containing a schematic diagram of a DC series RC circuit with indicated input square wave, number of time constants, universal time constant chart, applicable formulas, and four options, select the option for each question that indicates the output waveform across the resistor in the circuit IAW ST-KEP-50, Chap 3. Two of the three questions must be answered correctly. CTS: 11 Meas: W (1/0)

F 366 F3-8 Do you perform tasks on RC differentiating WSC  
 F 368 F3-10 Do you perform tasks on RC integrating WSC

51 42 36 14 49 20 9 14 0 4 3 17 16 9  
 43 29 31 12 31 17 8 14 0 5 2 13 11 7

0223 V 3f. Given three questions, each containing a schematic diagram of a DC series RC circuit with indicated input square wave, number of time constants, universal time constant chart, applicable formulas, and four options, select the option for each question that indicates the output waveform across the capacitor in the circuit IAW ST-KEP-50, Chap 3. Two out of the three questions must be answered correctly. CTS: 11 Meas: W (1/0)

F 366 F3-8 Do you perform tasks on RC differentiating WSC  
 F 368 F3-10 Do you perform tasks on RC integrating WSC

51 42 36 14 49 20 9 14 0 4 3 17 16 9  
 43 29 31 12 31 17 8 14 0 5 2 13 11 7

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T Task  
Y Nbr

Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0224 V 3g. Given three questions, each containing a schematic diagram of a DC series LR circuit with indicated input square wave, number of time constants, universal time constant chart, applicable formulas and four options, select the option for each question that indicates the output waveform developed across the inductor in the circuit IAW ST-KEP-50, Chap 3. Two out of three questions must be answered correctly. CTS: 11 Meas: W (.5/0)

F 367 F3-9 Do you perform tasks on RL differentiating WSC  
F 369 F3-11 Do you perform tasks on RL integrating WSC

37 26 23 10 32 17 7 10 0 3 3 14 11 10  
33 21 20 9 25 16 7 9 0 4 2 13 9 8

0225 V 3h. Given three questions, each containing a schematic diagram of a DC series LR circuit with indicated input square wave, number of time constants, universal time constant chart, applicable formulas and four options, select the option for each question that indicates the output waveform developed across the resistor in the circuit IAW ST-KEP-50, Chap 3. Two out of three questions must be answered correctly. CTS: 11 Meas: W (.5/0)

F 367 F3-9 Do you perform tasks on RL differentiating WSC  
F 369 F3-11 Do you perform tasks on RL integrating WSC

37 26 23 10 32 17 7 10 0 3 3 14 11 10  
33 21 20 9 25 16 7 9 0 4 2 13 9 8

0226 V 3i. Given a schematic diagram of an astable multivibrator with its output waveshape shown and three questions with three options each, select the option for each question which describes the effects on the output waveshape when a component value of the RC networks are changed IAW ST-KEP-50, Chap 3. Two of the three questions must be answered correctly. CTS: 23a Meas: W (0/2)

F 348 F2-2 Do you trace schematic diagrams of multivibrator circuits  
F 353 F2-7 Do the multivibrators you work with use RC networks  
F 355 F2-9 Do you perform tasks on astable (free running) multivibrators  
F 370 F3-12 Do you perform tasks on square wave generator WSC  
F 371 F3-13 Do you perform tasks on rectangular wave generator WSC

77 69 67 38 77 43 20 42 10 11 9 44 24 28  
60 53 52 29 65 39 12 29 7 10 6 41 24 24  
66 53 56 30 56 38 12 34 8 8 5 37 22 26  
62 53 48 27 54 29 19 27 4 10 3 31 21 23  
40 30 35 11 33 16 8 15 2 3 2 19 13 16

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Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0227

V 3j. Given a schematic diagram of a monostable multivibrator with its output waveshape shown and three questions with three options each, select the option for each question which describes the effects on the output waveshape when a component value of the RC network is changed IAW ST-KEP-50, Chap 3. Two of the three questions must be answered correctly. CTS: 23b Meas: W (2/0)

F 348

F2-2 Do you trace schematic diagrams of multivibrator circuits

F 353

F2-7 Do the multivibrators you work with use RC networks

F 356

F2-10 Do you perform tasks on monostable (one shot) multivibrators

F 370

F3-12 Do you perform tasks on square wave generator WSC

F 371

F3-13 Do you perform tasks on rectangular wave generator WSC

77	69	67	38	77	43	20	42	10	11	9	44	24	28
60	53	52	29	65	39	12	29	7	10	6	41	24	24
71	63	55	29	68	38	14	39	6	10	5	37	22	21
62	53	48	27	54	29	19	27	4	10	3	31	21	23
40	30	35	11	33	16	8	15	2	3	2	19	13	16

0228

V 3k. Given a schematic diagram of a bistable multivibrator with its output waveshapes shown and three questions with three options each, select the option for each question which describes the effects on the output waveshape when the input trigger frequency is changed IAW ST-KEP-50, Chap 3. Two of the three questions must be answered correctly. CTS: 23c Meas: W (1.5/0)

F 348

F2-2 Do you trace schematic diagrams of multivibrator circuits

F 353

F2-7 Do the multivibrators you work with use RC networks

F 357

F2-11 Do you perform tasks on bistable (flip flop) multivibrators

F 370

F3-12 Do you perform tasks on square wave generator WSC

F 371

F3-13 Do you perform tasks on rectangular wave generator WSC

77	69	67	38	77	43	20	42	10	11	9	44	24	28
60	53	52	29	65	39	12	29	7	10	6	41	24	24
74	60	54	35	67	40	19	41	10	11	6	41	24	24
62	53	48	27	54	29	19	27	4	10	3	31	21	23
40	30	35	11	33	16	8	15	2	3	2	19	13	16

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303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

Task Title

0229 V 31. Given a schematic diagram of a gated sawtooth generator with indicated input and output waveforms, and three questions with four options per question, select the option for each question that describes how the output linearity and amplitude can be changed, IAW ST-KEP-50, Chap 3. Two out of the three questions must be answered correctly. CTS: 38 Meas: W (2/0)

F 364 F3-6 Do you perform tasks on sawtooth wave generator WSC 74 63 53 20 39 27 18 19 4 7 3 33 19 23

0230 V 4. Modulation/Demodulation 6.5/3.5

0231 V 4a. Given three questions each with four options pertaining to heterodyning, select the option for each question that describes heterodyning IAW ST-KEP-50, Chap 4. Two out of the three questions must be answered correctly. CTS: 28a Meas: W (.5/0)

H 561 H4-1 Do you use "AM" modulation principles 41 14 18 11 59 59 14 2 0 1 2 47 48 49

0232 V 4b. Given a list of statements defining intelligence signal, RF carrier wave, and sidebands and a list of terms, match each statement to its correct term IAW ST-KEP-50, Chap 4. Two of the three matches must be correct. CTS: 28b Meas: W (0/1)

H 561 H4-1 Do you use "AM" modulation principles 41 14 18 11 59 59 14 2 0 1 2 47 48 49

0233 V 4c. Given three questions concerning amplitude modulation with four options each, select the option for each question that describes amplitude modulation IAW ST-KEP-50, Chap 4. Two of the three questions must be answered correctly. CTS: 28b Meas: W (2/1)

H 561 H4-1 Do you use "AM" modulation principles 41 14 18 11 59 59 14 2 0 1 2 47 48 49

D

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Y Nbr

Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0234

V 4d. Given three amplitude modulated waveforms illustrating 100% modulation, undermodulation, and overmodulation and a list of names, match each waveform to its correct name IAW ST-KEP-50, Chap 4. Two of the three matches must be correct.  
CTS: 28b Meas: W (1/0)

H 569

H4-9 Do you calculate percentage of modulation for AM transmitters

24 9 10 6 66 59 8 1 0 0 0 34 26 32

H 585

H4-25 Do you calculate percentage of modulation for SSB transmitters

2 4 1 8 10 41 4 0 0 0 1 23 15 11

0235

V 4e. Given three questions concerning amplitude demodulation with four options each, select the option for each question that describes demodulation in an AM system IAW ST-KEP-50, Chap 4. Two of the three questions must be answered correctly.  
CTS: 28b Meas: W (1/0)

H 570

H4-10 Do you use "AM" demodulation principles

34 8 12 9 33 64 11 3 0 1 2 45 34 43

0236

V 4f. Given the schematic diagram of a frequency converter and three questions with four options each, select the option for each question that describes how incoming Radio Frequencies are converted to Intermediate Frequencies IAW ST-KEP-50, Chap 4. Two of the three questions must be answered correctly. CTS: 28a Meas: W (1.5/0)

H 570

H4-10 Do you use "AM" demodulation principles

34 8 12 9 33 64 11 3 0 1 2 45 34 43

0237

V 4g. Given a list of statements defining frequency modulation, rate of deviation, and frequency demodulation and a list of terms, match each statement to its correct term IAW ST-KEP-50, Chap 4. Three of the four must be matched correctly.  
CTS: 28c Meas: W (.5/1.5)

H 593

H4-33 Do you use "FM" modulation principles

38 18 15 49 50 37 37 4 2 1 3 51 41 54

H 601

H4-41 Do you calculate modulation index for FM transmitters

10 8 6 16 33 21 10 1 1 0 0 26 11 9

H 602

H4-42 Do you measure frequency deviation for FM transmitters

26 16 12 47 53 30 22 2 2 1 1 41 24 24

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Y Nbr

Task Title

303 303 303 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

H 603 H4-43 Do you use "FM" demodulation principles

39 14 17 52 27 42 38 4 2 1 3 47 33 43

0238 V 5. Limiters and Clampers

4/.5

0239 V 5a. Given four schematic diagrams, two illustrating series diode negative limiters and two illustrating series diode positive limiters with an input signal and voltage shown on each diagram and a list of output waveforms, match each diagram to its correct waveform IAW ST-KEP-50, Chap 5. Three out of the four matches must be correct. CTS: 24a Meas: W (0/.5)

F 374 F4-2 Do you trace schematic diagrams of limiter circuits  
F 381 F4-9 Do you perform tasks on series diode limiter circuits

74 63 51 35 58 52 19 30 4 13 3 37 22 23  
56 41 31 23 40 44 16 24 3 5 2 29 18 14

0240 V 5b. Given five schematic diagrams of shunt diode limiters consisting of the following: limiter without bias, positive limiter with positive bias, positive limiter with negative bias, negative limiter with positive bias, and a negative limiter with negative bias and with an input signal and voltage shown on each diagram, and six output waveforms, match each diagram to its correct waveform IAW ST-KEP-50, Chap 5. Three out of the five matches must be correct. CTS: 24a Meas: W (1/0)

F 374 F4-2 Do you trace schematic diagrams of limiter circuits  
F 382 F4-10 Do you perform tasks on shunt diode limiter circuits  
F 383 F4-11 Do you perform tasks on bias limiter circuits

74 63 51 35 58 52 19 30 4 13 3 37 22 23  
53 50 30 21 33 43 13 23 3 5 2 29 17 15  
46 37 23 20 26 31 11 16 1 4 1 18 12 11

0241 V 5c. Given three schematic diagrams of Double Zener Diode Limiter circuits and four output waveshapes with an input signal and voltage shown for each diagram, match each diagram to its correct waveshape IAW UST-KEP-50, Chap 5. Two of the three must be matched correctly. CTS: 24b Meas: W (1/0)

F 384 F4-12 Do you perform tasks on zener diode circuits

66 49 43 30 49 44 18 28 3 10 2 34 20 17

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303 303 303 304 304 304 304 305 455 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

Task Title

0242 V 5d. Given five schematic diagrams consisting of the following transistor limiters: NPN Cutoff, NPN Saturation, PNP Cutoff, PNP Saturation, and over-driven and with an input signal shown on each diagram, and six output waveforms, match the diagram to its correct waveform IAW ST-KEP-50, Chap 5. Three of the five matches must be correct. CTS: 24c Meas: W (1/0)

F 386 F4-14 Do you perform tasks on triode limiter circuits

21 24 18 7 19 17 7 6 0 2 1 15 11 5

0243 V 5e. Given five schematic diagrams consisting of the following circuits: Positive Diode Clamper, Positive Clamper with positive bias, Positive Clamper with negative bias, Negative Clamper with negative bias, and a Negative Clamper with positive bias and with a square wave input signal and voltages shown on each diagram, and six output waveforms, match each diagram to its correct waveform IAW ST-KEP-50, Chap 5. Three out of the five matches must be correct.  
CTS: 24d Meas: W (1/0)

F 376 F4-4 Do you trace schematic diagrams of clamper circuits  
F 387 F4-15 Do you perform tasks on diode clamper circuits  
F 388 F4-16 Do you perform tasks on bias clamper circuits

64 59 47 27 54 42 16 28 2 9 2 28 18 15  
55 49 34 21 43 36 14 24 1 5 2 22 12 10  
44 42 22 13 29 23 9 15 1 3 2 15 7 6

0244 V 6. Soldering and Desoldering Procedures

6/2

0245 V 6a. Given the required tools, materials and wire, solder the wire to a bifurcate terminal. Soldered connection must conform to standards stated in SW-KEP-51, Chap 6, with no more than three errors.  
CTS: 1a, 14a, 14d Meas: PC (1/2)

A 141 A5-1 Do you solder or desolder hardware connections

93 85 87 90 94 92 83 90 95 95 87 96 93 98



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Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0246

V 6b. Given the required tools, materials and wires, solder two wires to one turret terminal. Soldered connections must conform to standards stated in SW-KEP-51 Chap 6, with no more than three errors.

CIS: 1a, 14a, 14d Meas: PC

(.5/0)

A 141

A5-1 Do you solder or desolder hardware connections

93 85 87 90 94 92 83 90 95 95 87 96 93 98

0247

V 6c. Given required tools and materials, desolder wires from bifurcate and turret terminals. Desoldering must conform to standards stated in SW-KEP-51, Chap 6, with no errors.

CIS: 1a, 14c, 14d Meas: PC

(.5/0)

A 141

A5-1 Do you solder or desolder hardware connections

93 85 87 90 94 92 83 90 95 95 87 96 93 98

0248

V 6d. Given the required tools, materials and a multimeter, solder two adjacent wires to a multipin cable connector, attach a terminal lug to a wire and install a cable tie strap. Work must conform to standard stated in SW-KEP-51, Chap 6, with no more than three errors. CIS: 1a, 14b, 14d, 44 Meas: PC

(1/0)

A 149

A5-9 Do you repair or fabricate connectors or cables on multiconductor cables

77 75 72 60 60 90 57 56 58 59 58 79 72 80

0249

V 6e. Given the required tools and a printed circuit board kit, solder components on the circuit board. Soldering must conform to standards stated in SW-KEP-51, Chap 6, with no more than three errors.

CIS: 1a, 14b, 14d Meas: PC

(2/0)

A 142

A5-2 Do you solder or desolder component connections such as resistors, capacitors, diodes, transformers, etc

94 85 86 88 93 87 63 79 66 61 54 87 64 59

A 143

A5-3 Do you solder or desolder printed circuit board connections

84 76 69 81 79 78 52 72 35 27 29 68 37 40

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Y Nbr

Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0250 V 6f. Given required soldering tools and materials, desolder a component from the previously constructed printed circuit board. Desoldering must conform to standards stated in SW-KEP-51, Chap 6, with no errors.  
CTS: 1a, 14c Meas: PC (1/0)

A 142 A5-2 Do you solder or desolder component connections such as resistors, capacitors, diodes, transformers, etc  
A 143 A5-3 Do you solder or desolder printed circuit board connections

94 85 86 88 93 87 63 79 66 61 54 87 64 59  
84 76 69 81 79 78 52 72 35 27 29 68 37 40

0251 POI E3AQR30020 009 ELECTRONIC PRINCIPLES Volume  
3 of 4 Volumes

0252 VI. Digital Circuits I

0253 VI 1. Numbering Systems

9/4

0254 VI 1a. Given a five digit number with its parts identified with letters, select the option which describes the lettered parts IAW Student Text. Two of three questions must be answered correctly.  
CTS: 31a, 31b, 31c Meas: W (0/1)

G 389 G1-1 Do you convert decimal numbers to binary numbers or binary numbers to decimal

71 38 34 24 35 25 27 57 20 18 17 31 21 18

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Task Title

303 303 303 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0255 VI 1b. Given a three digit decimal number and options expressed in a single numbering system other than decimal, choose the option which represents the number converted to another base IAW Student Text. Four of six questions must be answered correctly.  
CTS: 31a, 31b, 31c Meas: W (1/1)

G 389 G1-1 Do you convert decimal numbers to binary numbers or binary numbers to decimal 71 38 34 24 35 25 27 57 20 18 17 31 21 18  
G 390 G1-2 Do you convert octal numbers to binary or binary numbers to octal 55 29 34 18 20 12 17 49 20 15 13 17 15 7  
G 391 G1-3 Do you convert hexadecimal numbers to binary or binary numbers to hexadecimal 62 19 25 16 20 10 20 52 16 13 10 15 9 3  
G 393 G1-5 Do you convert hexadecimal numbers to decimal or decimal numbers to hexadecimal 63 19 23 15 22 10 17 50 16 12 9 12 9 3  
G 395 G1-7 Do you convert base number fractions to another base numbering system 35 19 20 10 16 9 14 22 8 12 8 10 11 3

0256 VI 1c. Given a three to eight digit number expressed in a base other than decimal, choose the option which expresses the number converted to decimal IAW Student Text. Four of six questions must be answered correctly.  
CTS: 31a, 31b, 31c Meas: W (2)

G 389 G1-1 Do you convert decimal numbers to binary numbers or binary numbers to decimal 71 38 34 24 35 25 27 57 20 18 17 31 21 18  
G 392 G1-4 Do you convert octal numbers to decimal or decimal numbers to octal 52 28 33 18 17 10 17 46 19 15 16 15 13 5  
G 393 G1-5 Do you convert hexadecimal numbers to decimal or decimal numbers to hexadecimal 63 19 23 15 22 10 17 50 16 12 9 12 9 3  
G 395 G1-7 Do you convert base number fractions to another base numbering system 35 19 20 10 16 9 14 22 8 12 8 10 11 3

0257 VI 1d. Given a three-digit octal number, choose the option which expresses the number converted to hexadecimal IAW Student Text. Two of three questions must be answered correctly. CTS: 31a, 31b, 31c Meas: W (1)

G 394 G1-6 Do you convert octal numbers to hexadecimal or hexadecimal numbers to octal 44 19 22 13 16 8 14 38 15 12 10 10 8 3

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303 303 303 304 304 304 304 305 455 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

Task Title

0258 VI le. Given a three digit hexadecimal number, choose the option which expresses the number converted to octal IAW Student Text. Two of three questions must be answered correctly. CTS: 31a, 31b, 31c Meas: W (1)

G 394 G1-6 Do you convert octal numbers to hexadecimal or hexadecimal numbers to octal

0259 VI lf. Given two five-digit numbers expressed in a base other than decimal, choose the option which expresses their sum IAW Student Text. Four of six questions must be answered correctly. CTS: 31a, 31b, 31c Meas: W (1/.5)

G 396 G1-8 Do you add binary numbers  
G 400 G1-12 Do you add octal numbers  
G 402 G1-14 Do you add hexadecimal numbers

56 36 28 19 26 20 21 43 15 15 10 22 16 9  
36 27 24 14 15 7 10 36 13 12 7 10 7 3  
42 17 15 13 18 9 12 34 10 11 5 8 5 2

0260 VI lg. Given two four-digit numbers expressed in a base other than decimal, choose the option which expresses their difference IAW Student Text. Four of six questions must be answered correctly. CTS: 31a, 31b, 31c (2/.5)

G 397 G1-9 Do you subtract binary numbers  
G 401 G1-13 Do you subtract octal numbers  
G 403 G1-15 Do you subtract hexadecimal numbers

54 36 27 18 26 20 17 39 13 14 10 20 14 6  
36 26 24 14 14 7 9 33 12 11 8 10 6 3  
40 17 15 13 17 9 11 32 9 10 5 9 5 2

0261 VI lh. Given a three-digit decimal number, choose the option which expresses the number converted to BCD IAW Student Text. Two of three questions must be answered correctly. CTS: 31d Meas: W (0/.5)

G 404 G1-16 Do you use binary coded decimal (BCD)

66 45 30 21 31 28 26 34 14 14 10 27 20 15

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Y Nbr

## Task Title

303 303 303 304 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0262 VI 1i. Given a twelve digit BCD number, choose the option which expresses the number converted to decimal IAW Student Text. Two of three questions must be answered correctly. CTS: 31d Meas: W (0/.5)

G 404 G1-16 Do you use binary coded decimal (BCD) 66 45 30 21 31 28 26 34 14 14 10 27 20 15

0263 VI 1j. Given a seven-digit binary number, choose the option which expresses the number converted to Gray Code IAW Student Text. Two of three questions must be answered correctly. CTS: 31e Meas: W (0.5)

G 405 G1-17 Do you use gray codes 51 43 17 7 9 5 9 19 3 4 2 5 3 2

0264 VI 1k. Given a seven-digit Gray Code number, choose the option which expresses the number converted to binary IAW Student Text. Two of three questions must be answered correctly. CTS: 31e Meas: W (0.5)

G 405 G1-17 Do you use gray codes 51 43 17 7 9 5 9 19 3 4 2 5 3 2

0265 VI 2. Logic Gates (13/4)

0266 VI 2a. Given a schematic diagram of logic gating circuit, choose the option which represents the circuits truth table IAW Student Text. Three of five questions must be answered correctly. CTS: 32a, 32b, 32c, 33a, 33b, 33c Meas: W (6/2)

G 412 G1-24 Do you trace data flow through logic symbol diagrams 76 50 45 36 56 36 31 72 20 21 12 38 25 23  
G 417 G1-29 Do you trace data flow through circuits using positive logic (High = Binary 1) 69 46 40 28 46 31 20 64 12 12 9 21 16 14  
G 418 G1-30 Do you trace data flow through circuits using negative logic (High = Binary 0) 59 38 32 22 35 24 17 51 10 11 7 19 13 13  
G 419 G1-31 Do you perform tasks related to AND gates 76 51 48 35 64 40 28 68 20 21 12 38 23 23  
G 420 G1-32 Do you perform tasks related to OR gates 76 50 48 35 64 40 28 67 20 21 12 37 23 23  
G 421 G1-33 Do you perform tasks related to inhibited gates logic functions 59 36 34 31 48 24 21 50 10 9 7 29 19 18

D T Task Y Nbr	Task Title	303	303	304	304	304	304	304	305	455	455	455	455	455	455
G 422	G1-34 Do you perform tasks related to NAND or NOR gates	74	47	47	34	62	37	26	65	20	19	11	32	21	20
G 423	G1-35 Do you perform tasks related to exclusive OR/NOR logic functions	69	43	45	30	55	33	25	60	17	14	9	24	19	14
G 438	G1-50 Do you perform tasks on RTL (resistor transistor logic formally DCTL)	31	17	18	13	23	9	8	28	4	4	3	6	5	1
G 439	G1-51 Do you perform tasks on DTL (diode transistor logic)	33	20	19	13	22	13	9	30	5	4	3	7	5	1
G 440	G1-52 Do you perform tasks on TTL (transistor transistor logic)	46	45	37	19	37	20	18	54	4	5	4	12	10	1

0267 VI 2b. Given a logic gate symbol, choose the option which expresses an operational characteristic of the gate IAW Student Text. Twelve of seventeen questions must be answered correctly. CTS: 32a, 32b, 32c, 33a, 33b, 33c, 33p Meas: W (7/2)

G 412	G1-24 Do you trace data flow through logic symbol diagrams	76	50	45	36	56	36	31	72	20	21	12	38	25	23
G 417	G1-29 Do you trace data flow through circuits using positive logic (High = Binary 1)	69	46	40	28	46	31	20	64	12	12	9	21	16	14
G 418	G1-30 Do you trace data flow through circuits using negative logic (High = Binary 0)	59	38	32	22	35	24	17	51	10	11	7	19	13	13
G 419	G1-31 Do you perform tasks related to AND gates	76	51	48	35	64	40	28	68	20	21	12	38	23	23
G 420	G1-32 Do you perform tasks related to OR gates	76	50	48	35	64	40	28	67	20	21	12	37	23	23
G 421	G1-33 Do you perform tasks related to inhibited gates logic functions	59	36	34	31	48	24	21	50	10	9	7	29	19	18
G 422	G1-34 Do you perform tasks related to NAND or NOR gates	74	47	47	34	62	37	26	65	20	19	11	32	21	20
G 423	G1-35 Do you perform tasks related to exclusive OR/NOR logic functions	69	43	45	30	55	33	25	60	17	14	9	24	19	14

0268 VI 3. Boolean Equations 4/2

0269 VI 3a. Given a fourth level logic diagram, select the option which identifies the equivalent Boolean equation IAW Student Text. Two of three questions must be answered correctly. CTS: 31f Meas: W (2/5)

G 435	G1-47 Do you develop Boolean equations from logic circuits or diagrams	20	12	11	8	9	10	9	19	6	5	5	8	6	2
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## Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0270 VI 3b. Given a second level Boolean equation, select the logic diagram for each equation IAW Student Text. Two of three questions must be answered correctly.  
CTS: 31f Meas: W (.5/1.5)

G 436 G1-48 Do you develop logic diagrams from Boolean equations  
G 437 G1-49 Do you simplify Boolean expressions using Boolean algebra

17 12 9 8 8 9 8 16 6 5 4 8 5 2  
20 13 11 9 11 10 8 18 6 5 4 7 5 2

0271 VI 3c. Given a single gate Boolean equation, select the option which represents the equation of the complementary gate IAW Student Text. Two of three questions must be answered correctly.  
CTS: 31f Meas: W (1.5)

G 437 G1-49 Do you simplify Boolean expressions using Boolean algebra

20 13 11 9 11 10 8 18 6 5 4 7 5 2

0272 VI 4. Logic Symbology

16/5

0273 VI 4a. Given a delay-line symbol and input waveshape, choose the option which represents the output waveshape IAW Student Text. Three of four questions must be answered correctly. CTS: 32h, 33j Meas: W (1)

G 429 G1-41 Do you perform tasks related to delay (One-shot) logic functions

63 36 36 19 42 23 13 53 7 8 5 17 11 9

0274 VI 4b. Given a logic symbol of a T-type flip-flop and an input waveshape, choose the option which represents the output waveshape IAW Student Text. Three of four questions must be answered correctly.  
CTS: 32e, 33i Meas: W (3/1)

G 426 G1-38 Do you perform tasks related to T(Toggle) flip flops

67 37 41 25 50 24 16 56 10 10 6 14 9 6

D  
T Task  
Y Nbr

Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0275 VI 4c. Given a logic symbol of a D-type flip-flop and input waveshapes, choose the option which represents the output waveshape IAW Student Text. Three of four questions must be answered correctly.  
CTS: 32e, 33i Meas: W (4/1)

G 425 G1-37 Do you perform tasks related to D(Data) flip flops

67 30 38 24 35 21 17 54 8 11 7 18 9 6

0276 VI 4d. Given a logic symbol of an R-S flip-flop and input waveshapes, choose the option which represents the output waveshape IAW Student Text. Three of four questions must be answered correctly.  
CTS: 32e, 33i Meas: W (3/2)

G 424 G1-36 Do you perform tasks related to RS flip flops

50 32 39 23 27 22 17 51 9 7 7 18 11 7

0277 VI 4e. Given a logic symbol of a J-K flip-flop and input waveshapes, choose the option which represents the output waveshape IAW Student Text. Three of four questions must be answered correctly.  
CTS: 32e, 33i Meas: W (5)

G 427 G1-39 Do you perform tasks related to JK flip flops

71 45 39 25 50 25 18 57 7 11 5 13 12 5

0278 VI 4f. Given a logic symbol for Inverter, Amplifier, Single-shot, Gating oscillator, General logic symbol, Magnetic head and a list of names, match each symbol to its name IAW Student Text. Four of six symbols must be matched correctly.  
CTS: 33d, 33e, 33f, 33g, 33k, 33l Meas: W (0/1)

G 428 G1-40 Do you perform tasks related to Schmidt triggers  
G 429 G1-41 Do you perform tasks related to delay (One-shot) logic functions  
G 432 G1-44 Do you perform tasks related to inverters

63 36 37 22 54 29 18 46 9 9 6 19 12 11  
63 36 36 19 42 23 13 53 7 8 5 17 11 9  
70 45 44 29 56 30 23 62 13 14 7 26 18 14



D  
 T Task  
 Y Nbr

303 303 303 304 304 304 305 455 455 455 455 455 455  
 51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

Task Title

0279 VI 5. Storage Registers and Comparators

6/2

0280 VI 5a. Given a storage register logic symbol, choose the option which expresses a characteristic of symbol IAM Student Text. Two of three questions must be answered correctly. CTS: 33m, 35a Meas: W (0/1)

G 498 G3-11 Do you trace logic diagrams of circuits containing registers 59 41 27 23 23 20 14 53 6 7 7 11 9 9  
 G 502 G3-15 Do you perform tasks on storage registers in logic circuits 60 38 28 20 24 18 11 48 3 7 5 9 5 3

0281 VI 5b. Given a logic diagram of two connected storage registers, choose the option which expresses the type of data transfer between the registers IAM Student Text. Three of four questions must be answered correctly. CTS: 35a Meas: W (1.5)

G 498 G3-11 Do you trace logic diagrams of circuits containing registers 59 41 27 23 23 20 14 53 6 7 7 11 9 9  
 G 502 G3-15 Do you perform tasks on storage registers in logic circuits 60 38 28 20 24 18 11 48 3 7 5 9 5 3

0282 VI 5c. Given a logic diagram, consisting of two storage registers connected by a transfer network, with a specific symptom of a malfunction, select the option which identifies the faulty component IAM Student text. Two of three questions must be answered correctly. CTS: 35c Meas: W (1.5)

G 502 G3-15 Do you perform tasks on storage registers in logic circuits 60 38 28 20 24 18 11 48 3 7 5 9 5 3

D  
T Ysk  
Y Nbr

## Task Title

303 303 303 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 X1A X1B X1C X2A X2B X2C

0283 VI 5d. Given a logic diagram of a comparator with specific inputs, choose the option which expresses the logic levels at specific test points IAW Student Text. Three of four questions must be answered correctly. CTS: 36a Meas: W (2.5)

G 510 G3-23 Do you perform tasks on comparators

53 41 24 22 32 12 19 41 6 9 4 12 7 7

0284 VI 5e. Given a logic diagram of a comparator with a specific symptom of malfunction, select the option which identifies the faulty component IAW Student Text. Two of three questions must be answered correctly. CTS: 36b Meas: W (.5/1)

G 510 G3-23 Do you perform tasks on comparators

53 41 24 22 32 12 19 41 6 9 4 12 7 7

0285 VI 6. Schmitt Trigger and DA/AD Converters 4/1

0286 VI 6a. Given a schematic diagram of a Schmitt Trigger circuit and an input waveshape, choose the option which represents the output waveshape IAW Student Text. Three of four questions must be answered correctly. CTS: 32d, 33h Meas: W (0/1)

F 372 F3-14 Do you perform tasks on Schmitt trigger WSC  
G 428 G1-40 Do you perform tasks related to Schmitt triggers

63 49 41 28 65 30 17 27 4 7 3 23 16 16  
63 36 37 22 54 29 18 46 9 9 6 19 12 11

0287 VI 6b. Given a specific circuit component and a schematic diagram of a Schmitt Trigger circuit, choose the option which expresses the purpose of the selected component IAW Student Text. Three of four questions must be answered correctly. CTS: 32d Meas: W (1)

F 372 F3-14 Do you perform tasks on Schmitt trigger WSC  
G 428 G1-40 Do you perform tasks related to Schmitt triggers

63 49 41 28 65 30 17 27 4 7 3 23 16 16  
63 36 37 22 54 29 18 46 9 9 6 19 12 11

D  
T Task  
Y Nbr

Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0288 VI 6c. Given a schematic diagram of a digital-to-analog converter with a specified count, choose the option expresses the analog output IAW Student Text. Four of six questions must be answered correctly. (1)  
CTS: 32f Meas: W

G 516 G4-1 Do you trace data flow through A/D converters  
G 522 G4-7 Do the converters you perform tasks on use ramp conversion

73 47 37 20 36 23 33 33 8 14 12 20 15 13  
33 25 10 3 18 5 7 12 1 2 1 2 7 6

0289 VI 6d. Given a schematic diagram of an analog-to-digital converter divided into four sections, choose the options which represent the selected section IAW Student Text. Three of four questions must be answered correctly. CTS: 32g Meas: W (0.5)

G 516 G4-1 Do you trace data flow through A/D converters  
G 522 G4-7 Do the converters you perform tasks on use ramp conversion

73 47 37 20 36 23 33 33 8 14 12 20 15 13  
33 25 10 3 18 5 7 12 1 2 1 2 7 6

0290 VI 6e. Given a specific circuit component and a schematic diagram of an analog-to-digital converter, choose the option which expresses the purpose of the selected component IAW Student Text. Four of six questions must be answered correctly. CTS: 32g Meas: W (1.5)

G 516 G4-1 Do you trace data flow through A/D converters  
G 522 G4-7 Do the converters you perform tasks on use ramp conversion

73 47 37 20 36 23 33 33 8 14 12 20 15 13  
33 25 10 3 18 5 7 12 1 2 1 2 7 6

0291 VII. Digital Circuits II

0292 VII 1. Digital Logic Modules

4/2

D	Tsk	Nbr
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Task Title

303	303	303	304	304	304	305	455	455	455	455	455	455	455
51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C

0293

VII 1a. Given a logic diagram of a TTL IC chip and input logic levels to specific pins, choose the option which expresses the output logic levels IAW Student Text. Three of five questions must be answered correctly. CIS: 32a, 32b Meas: W

6 440

**GI-52 Do you perform tasks on TTL (transistor transistor logic)**

46 45 37 19 37 20 18 54 4 5 4 12 10 1

0294

VII lb. Given an oscilloscope, digital logic trainer and the basic gates module with its logic diagram, draw the waveshape at specified test points indicating PRT, PRF, and PW for each IAW Student Workbook. All measurements must be within  $\pm 10\%$  of instructor's findings. CTS: 32a, 32b, 32e Meas: PC, W

**H 620**

H4-60 Do you calculate pulse recurrence time (PRT)

58 47 42 1 31 1 8 2 0 1 1 25 16 15

**H 621**

or pulse recurrence frequency (PRF) for PM transmitters  
H4-61 Do you measure PRT, PRF or pulse width  
for PM transmitters

60 49 45 2 37 1 9 3 0 1 2 32 18 18

0295

## VII 2. Binary Counters

14/4

0296

VII 2a. Given a logic diagram of a serial counter, choose the option which expresses an operating characteristic of the counter IAW Student Text. Seven of ten questions must be answered correctly.

CIS: 330, 34a Meas: W

6488

**G3-1 Do you trace data flow through circuits containing counters**

63 45 38 26 49 28 18 49 12 8 6 26 18 16

G 491

### G3-4 Do you perform tasks on up counters in logic circuits

57 47 32 22 46 25 13 44 6 5 23 15 15

492

**G3-5 Do you perform tasks on DOWN counters in logic circuits**

54	45	28	19	39	24	12	40	5	5	3	23	13	14
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265 3

### G3-10 Do you perform tasks on asynchronous (serial) counters in logic circuits

42 32 23 17 29 16 11 32 3 5 2 9 8 6

D  
T Task  
Y Nbr

Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0297 VII 2b. Given an oscilloscope, digital logic trainer, and a serial counter module with its logic diagram, draw output waveshapes indicating PRT, PRF and PW for each IAW Student Workbook. All measurements must be within + or - 10% of instructor's findings.  
CTS: 34b Meas: PC, W (2.5)

G 488 G3-1 Do you trace data flow through circuits containing counters  
G 491 G3-4 Do you perform tasks on UP counters in logic circuits  
G 492 G3-5 Do you perform tasks on DOWN counters in logic circuits  
G 497 G3-10 Do you perform tasks on asynchronous (serial) counters in logic circuits  
H 620 H4-60 Do you calculate pulse recurrence time (PRT) or pulse recurrence frequency (PRF) for PM transmitters  
H 621 H4-61 Do you measure PRT, PRF or pulse width for PM transmitters

63 45 38 26 49 28 18 49 12 8 6 26 18 16  
57 47 32 22 46 25 13 44 6 5 5 23 15 15  
54 45 28 19 39 24 12 40 5 5 5 18 13 14  
42 32 23 17 29 16 11 32 3 5 2 9 8 6  
58 47 42 1 31 1 8 2 0 1 1 25 16 15  
60 49 45 2 37 1 9 3 0 1 2 32 18 18

0298 VII 2c. Given a logic diagram of a parallel counter, choose the option which expresses an operating characteristic of the counter IAW Student Text. Seven of ten questions must be answered correctly.  
CTS: 34a Meas: W (4/2)

G 488 G3-1 Do you trace data flow through circuits containing counters  
G 491 G3-4 Do you perform tasks on UP counters in logic circuits  
G 492 G3-5 Do you perform tasks on DOWN counters in logic circuits  
G 496 G3-9 Do you perform tasks on synchronous (parallel) counters in logic circuits

63 45 38 26 49 28 18 49 12 8 6 26 18 16  
57 47 32 22 46 25 13 44 6 5 5 23 15 15  
54 45 28 19 39 24 12 40 5 5 5 18 13 14  
45 32 23 14 26 14 10 31 2 5 3 7 9 5

0299 VII 2d. Given an oscilloscope, digital logic trainer and parallel counter module with its logic diagram, draw the output waveshape at specified points indicating PRF, PRT and PW for each IAW Student Workbook. All measurements must be within + or - 10% of instructor's finding.  
CTS: 34b Meas: PC, W (2.5)

G 488 G3-1 Do you trace data flow through circuits containing counters

63 45 38 26 49 28 18 49 12 8 6 26 18 16

D  
T  
Y

Task Title

303	303	303	304	304	304	305	455	455	455	455	455	455	455
51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C

6 490 G3-3 Do you troubleshoot counters to circuit level components

40 40 27 22 39 20 9 38 6 5 2 16 7 9

**G 491 G3-4 Do you perform tasks on UP counters in logic circuits**

57 47 32 22 46 25 13 44 6 5 5 23 15 15

**G 496 G3-9 Do you perform tasks on synchronous (parallel) counters in logic circuits**

45	32	23	14	26	14	10	31	2	5	3	7	9	5
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H 620 H4-60 Do you calculate pulse recurrence time (PRT) or pulse recurrence frequency (PRF) for PM transmitters?

58 47 42 1 31 1 8 2 0 1 1 25 16 15

VII 2e. Given a logic diagram of a counter with a specific symptom of malfunction, select the option which identifies the faulty component IAW Student Text. Two of three questions must be answered correctly. CTS: 34c Meas: W

**G 488 G3-1 Do you trace data flow through circuits containing counters**

63 45 38 26 49 28 18 49 12 8 6 26 18 16

**G 490 G3-3 Do you troubleshoot counters to circuit level components**

40 40 27 22 39 20 9 38 6 5 2 16 7 9

**G 491 G3-4 Do you perform tasks on UP counters in logic circuits**

57 47 32 22 46 25 13 44 6 5 5 23 15 15

0301 VII 3. Special Counters

8.5/2.5

0302 VII 3a. Given a logic diagram of a ring counter, choose the option which expresses an operating characteristic of the counter IAW Student Text. Four of six questions must be answered correctly. CTS: 34a Meas: W

**G 494 G3-7 Do you perform tasks on ring counters in logic circuits**

34 15 10 7 19 10 5 26 1 4 2 3 3

0303 VII 3b. Given an oscilloscope, digital logic trainer and the ring counter module with its logic diagram, draw the output waveshapes at specified test points indicating PRF, PRT and PW for each IAW Student Workbook. All measurements must be within + or - 10% of instructor's findings. CTS: 34b Meas: PC, W

**G 494 G3-7 Do you perform tasks on ring counters in logic circuits**

34 15 10 7 19 10 5 26 1 4 2 3 3

D  
T Task  
Y Nbr

Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0304

VII 3c. Given a logic diagram of a modified counter, choose the option which expresses an operating characteristic of the counter IAW Student Text. Four of six questions must be answered correctly.

CTS: 34a Meas: W (3.5/.5)

G 495

G3-8 Do you perform tasks on modulus counters in logic circuits

10 10 9 5 11 4 3 19 0 2 2 2 2 0

0305

VII 3d. Given an oscilloscope, digital logic trainer and a MOD-10 counter module with its logic diagram, draw the waveshape at specified test points IAW Student Workbook. All measurements must be within + or - 10% of instructor's findings. CTS: 34b Meas: PC, W (2.5)

G 493

G3-6 Do you perform tasks on DECADE counters in logic circuits

38 35 22 15 44 14 8 15 4 4 3 8 3 6

0306

VII 4. Shift Registers

8/3.5

0307

VII 4a. Given a logic symbol of a shift register, choose the option which expresses data movement characteristics of the register IAW Student Text. Two of three questions must be answered correctly.

CTS: 33n, 35a Meas: W (.5/1.5)

G 501

G3-14 Do you perform tasks on shift registers in logic circuits

63 40 28 21 21 20 13 47 4 7 5 11 6 6

0308

VII 4b. Given a diagram depicting a shift function, choose the option which interprets the diagram IAW Student Text. Six of eight questions must be answered correctly. CTS: 35a Meas: W (2)

G 501

G3-14 Do you perform tasks on shift registers in logic circuits

63 40 28 21 21 20 13 47 4 7 5 11 6 6

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

Task Title

0309 VII 4c. Given a logic diagram of a shift register, input logic levels, and a specified number of control pulses, choose the option which expresses the logic state of the register after the control pulses have passed IAW Student Text. Three of five questions must be answered correctly. CTS: 35a Meas: W (1/2)

G 501 G3-14 Do you perform tasks on shift registers in logic circuits

63 40 28 21 21 20 13 47 4 7 5 11 6 6

0310 VII 4d. Given a logic diagram of a shift register a specific symptom of malfunction, select the option which identifies the faulty component IAW Student Text. Two of three questions must be answered correctly. CTS: 35c Meas: W (2)

G 501 G3-14 Do you perform tasks on shift registers in logic circuits

63 40 28 21 21 20 13 47 4 7 5 11 6 6

0311 VII 4e. Given an oscilloscope, digital logic trainer, register modules with their logic diagrams and two sets of input conditions, measure the logic levels at specified test points IAW Student Workbook. Four of six logic levels must be correct. CTS: 35b Meas: PC, W (2.5)

C 501 G3-14 Do you perform tasks on shift registers in logic circuits

63 40 28 21 21 20 13 47 4 7 5 11 6 6

0312 VII 5. Detectors

7.5/4



D  
T Task  
Y Nbr

Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0313

VII 5a. Given a logic diagram of a detector circuit, choose the option which expresses an operating characteristic of the detector IAW Student Text. Seven of ten questions must be answered correctly. CTS: 48a Meas: W

(4/2)

G 515

G3-28 Do you perform tasks on count detect circuits

33 15 11 12 18 7 7 23 2 4 2 4 2 0

0314

VII 5b. Given a logic diagram of a detector circuit and specific symptoms of malfunction, select the option which identifies the faulty component IAW Student Text. Two of three questions must be answered correctly. CTS: 48c Meas: W

(0/2)

G 515

G3-28 Do you perform tasks on count detect circuits

33 15 11 12 18 7 7 23 2 4 2 4 2 0

0315

VII 5c. Given an oscilloscope, digital logic trainer and counter detector modules with their logic diagrams, draw the output waveshape at specified test points indicating PRF, PRT and PW for each IAW Student Workbook. All measurements must be within + or - 10% of instructor's findings. CTS: 48b Meas: PC, W

(3.5)

G 515

G3-28 Do you perform tasks on count detect circuits

33 15 11 12 18 7 7 23 2 4 2 4 2 0

0316

VII 6. Parity and Adders

16/4

0317

VII 6a. Given a logic diagram of a parity generator circuit, choose the option which expresses the input conditions that results in assignment of a parity bit IAW Student Text. Two of three questions must be answered correctly. CTS: 49a Meas: W

(2)

G 511

G3-24 Do you perform tasks on parity generators or checkers

58 29 13 19 12 9 11 44 4 7 2 7 4 3

D  
T Task  
Y Nbr

Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0318 VII 6b. Given a logic diagram of a parity checker circuit with specific inputs, choose the option which expresses the type of parity being checked and if an error is indicated IAW Student Text. Three of four questions must be answered correctly.  
CTS: 49a Meas: W (3)

G 511 G3-24 Do you perform tasks on parity generators or checkers 58 29 13 19 12 9 11 44 4 7 2 7 4 3

0319 VII 6c. Given a logic diagram of a parity circuit and specific symptom of a malfunction, select the option which identifies the faulty component IAW Student Text. Two of three questions must be answered correctly. CTS: 49b Meas: W (1/1)

G 511 G3-24 Do you perform tasks on parity generators or checkers 58 29 13 19 12 9 11 44 4 7 2 7 4 3

0320 VII 6d. Given a logic diagram of a basic adder and specific inputs, choose the option which expresses the output at specified points on the diagram IAW Student Text. Three of four questions must be answered correctly. CTS: 37a Meas: W (.5/1)

G 513 G3-26 Do you perform tasks on adders 53 36 17 12 20 10 8 31 3 8 4 6 3 3

0321 VII 6e. Given a logic diagram of a serial adder circuit and specific inputs, choose the option which expresses the contents of the SUM register and Carry output after a specified number of shift pulses has passed IAW Student Text. Two of three questions must be answered correctly. CTS: 37a Meas: W (3)

G 513 G3-26 Do you perform tasks on adders 53 36 17 12 20 10 8 31 3 8 4 6 3 3

D

T Task

Y Nbr

Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0322

VII 6f. Given a logic diagram of a parallel adder and two binary numbers to be added, choose the option which represents the resultant circuit outputs IAW Student Test. Two of three questions must be answered correctly.  
CTS: 37a Meas: W (2.5/1.5)

G 513

G3-26 Do you perform tasks on adders

53 36 17 12 20 10 8 31 3 8 4 6 3 3

0323

VII 6g. Given a logic diagram of an adder circuit and a specific symptom of malfunction, select the option which identifies the faulty component IAW Student Test. Two of three questions must be answered correctly.  
CTS: 37c Meas: W (1/.5)

G 513

G3-26 Do you perform tasks on adders

53 36 17 12 20 10 8 31 3 8 4 6 3 3

0324

VII 6h. Given an oscilloscope, digital logic trainer, adder module, sum register module, logic diagrams and sets of input conditions, measure logic levels at specified test points IAW Student Workbook. Three of four sets of logic levels must be correct.  
CTS: 37b Meas: PC, W (3)

G 513

G3-26 Do you perform tasks on adders

53 36 17 12 20 10 8 31 3 8 4 6 3 3

0325

VIII. Electron Tube Principles

0326

VIII 1. Electron Tubes

6/2

0327

VIII 1a. Describe the conduction characteristics of a diode tube. CTS: 25a Meas: W (.5/1)

A 125

A4-6 Do you perform tasks on diode tubes

49 59 51 15 65 45 6 5 12 14 5 44 26 25

B  
T Task  
Y Nbr

## Task Title

303 303 303 304 304 304 305 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C0328 VIII lb. Determine the correct current path through a  
half-wave rectifier circuit. CTS: 25a Meas: W (.5)D 280 D1-6 Do you perform tasks on half-wave rectifier  
power supplies 73 71 66 50 68 62 33 46 18 16 15 56 31 340329 VIII lc. Describe how the control grid voltage effects  
the conduction characteristics of a triode tube.  
CTS: 25b Meas: W (1)

A 126 A4-7 Do you perform tasks on triode tubes 46 65 55 15 65 48 3 4 12 16 7 46 28 28

0330 VIII ld. Explain the biasing arrangements used in  
electron tube amplifier circuits.  
CTS: 25b Meas: W (1)C 235 C4-2 Do you trace schematic diagrams of electron tube  
amplifiers 54 75 47 33 70 59 40 6 9 18 5 51 26 280331 VIII le. Describe the effect the screen grid has on  
the output signal of a tetrode amplifier.  
CTS: 25c Meas: W (.5)

A 127 A4-8 Do you perform tasks on tetrode tubes 37 47 42 13 56 47 3 2 8 11 5 35 24 21

0332 VIII lf. Describe the effect the suppressor grid has  
on the output signal of a pentode tube.  
CTS: 25d Meas: W (.5)

A 128 A4-9 Do you perform tasks on pentode tubes 37 57 48 14 58 49 3 2 8 11 3 44 27 28

0333 VIII lg. Describe the operational characteristics  
of a beam power tube. CTS: 27a Meas: W (.5)

A 129 A4-10 Do you perform tasks on beam power tubes 22 42 19 25 53 9 32 3 2 3 2 9 8 8

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51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0334 VIII 1h. Determine the function of each element of a cathode ray tube (CRT). CTS: 27b Meas: W (.5)

A 139 A4-20 Do you perform tasks on electrostatic CRT 41 34 42 10 7 14 4 22 4 2 3 24 16 14  
A 140 A4-21 Do you perform tasks on electromagnetic CRT 73 60 47 16 9 11 8 29 8 4 4 30 20 17

0335 VIII 1i. From a characteristic curve determine the operational characteristics of a gas filled voltage regulating tube. CTS: 27c Meas: W (1/.5)

0336 VIII 1j. Determine the function of the Nixie tube. CTS: 27d Meas: W (0/.5)

0337 VIII 2. Electron Tube Applications 5/1

0338 VIII 2a. Describe the effect various circuit components have on the gain of a triode voltage amplifier. CTS: 26 Meas: W (1/1)

0339 VIII 2b. Describe the effect that each component has on the operation of a electron tube LC oscillator. CTS: 26 Meas: W (2)

0340 VIII 2c. Describe how the electron tube series voltage regulator responds to changes in the voltage adjust control. CTS: 26 Meas: W (2)

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303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0341 IX. Transmit/Receive Systems

0342 IX 1. Transmission Lines and Antennas 2.5/2

0343 IX 1a. Given pictorials of twisted pair, twin lead, open two wire, flexible coaxial and rigid coaxial transmission lines and a list of names, match each type with its name IAW Student Text. Three of the five matches must be correct. CTS: 42 Meas: W (10/1)

H 531 H1-8 Do you perform tasks on open-wire transmission lines  
H 532 H1-9 Do you perform tasks on twisted pair transmission lines  
H 533 H1-10 Do you perform tasks on twin lead transmission lines  
H 534 H1-11 Do you perform tasks on flexible coaxial transmission lines  
H 535 H1-12 Do you perform tasks on rigid coaxial transmission lines  
22 12 10 15 20 26 9 6 4 4 3 18 18 18  
41 14 17 30 23 29 19 17 2 4 3 16 28 22  
24 11 10 20 23 28 15 5 1 4 2 11 10 13  
72 55 49 45 72 69 48 15 10 7 7 67 62 69  
63 43 40 30 57 35 32 5 2 2 1 42 24 31

0344 IX 1b. Given a list of transmission line characteristics to include: characteristic impedance, cutoff frequency, physical length, electrical length, resonant line, and non-resonant line, and a statement describing each, match each characteristic to the statement which describes it IAW Student Text. Four of the six must be matched correctly. CTS: 42 Meas: W (.5/1)

H 524 H1-1 Do you measure electrical length on transmission lines  
H 525 H1-2 Do you measure physical length on transmission lines  
H 526 H1-3 Do you measure standing wave ratio (SWR) on transmission lines  
H 528 H1-5 Do you match transmission line impedance with loads  
H 529 H1-6 Do you calculate the characteristic impedance (Z0) of transmission lines  
36 12 11 10 72 36 9 4 2 2 2 32 22 28  
40 27 19 19 63 44 17 7 3 2 2 45 30 45  
64 53 31 25 77 60 31 2 1 2 1 57 60 63  
38 24 19 22 58 49 17 6 0 1 1 27 18 29  
15 10 9 11 30 24 7 2 0 1 0 10 7 13

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0345 IX lc. Given a list of terms pertaining to electro-  
magnetic wave propagation to include: induction field,  
radiation field, E-lines, and H-lines, and a statement  
describing each, match each statement to the term it  
describes IAW Student Text. Three out of four must  
be matched correctly. CTS: 42 Meas: W (1)

H 654 H5-25 Do you perform tasks on antennas with  
vertical polarization 37 61 53 33 304 304 304 305 455 455 455 455 455 32  
H 655 H5-26 Do you perform tasks on antennas with  
horizontal polarization 39 54 59 32 69 38 7 1 1 2 4 33 22 29  
H 656 H5-27 Do you perform tasks on antennas with  
circular polarization 86 42 54 6 25 17 57 1 0 1 3 21 20 25

0346 IX ld. Given three statements describing vertical,  
horizontal, and circular polarization and a list of  
names, match each type of polarization to its re-  
spective name IAW Student Text. Two of the three  
matches must be correct. CTS: 42 Meas: W (1)

H 654 H5-25 Do you perform tasks on antennas with  
vertical polarization 37 61 53 33 304 304 304 305 455 455 455 455 455 32  
H 655 H5-26 Do you perform tasks on antennas with  
horizontal polarization 39 54 59 32 69 38 7 1 1 2 4 33 22 29  
H 656 H5-27 Do you perform tasks on antennas with  
circular polarization 86 42 54 6 25 17 57 1 0 1 3 21 20 25

0347 IX 2. Special Purpose Devices 4/2

0348 IX 2a. Given three questions pertaining to resonant  
cavities with four options per question, select an  
option for each question that states a purpose of a  
resonant cavity IAW Student Text. Two of the three  
questions must be answered correctly. CTS: 43a  
Meas: W (0.5)

H 553 H3-1 Do you trace schematic or block diagrams of  
circuits containing resonant cavities 62 53 46 27 53 29 25 1 1 0 2 34 23 26

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Task Title

303 303 303 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0349 IX 2b. Given three questions pertaining to resonant cavities with four options per question, select the option for each question that describes the factors that determine the resonant frequency IAW Student Text. Two out of the three questions must be answered correctly. CTS: 43a Meas: W (0.5)

H 557 H3-5 Do you measure frequency of resonant cavities

53 44 46 17 41 22 14 1 1 0 1 27 18 20

0350 IX 2c. Given three pictorial diagrams of resonant cavities illustrating capacitive, inductive, and volume tuning and a list of types of tuning, match each pictorial to its type of tuning IAW Student Text. Two of the three must be matched correctly. CTS: 43a Meas: W (0.5)

H 555 H3-3 Do you tune or adjust resonant cavities electrically  
H 556 H3-4 Do you tune or adjust resonant cavities physically

47 42 41 19 44 25 17 1 1 0 1 25 16 20  
58 52 45 29 54 27 25 1 1 0 1 29 18 17

0351 IX 2d. Given three pictorial diagram of resonant cavities illustrating probe, loop and iris coupling and a list or types of coupling, match each pictorial to the type of coupling IAW Student Text. Two of the three must be matched correctly. CTS: 43a Meas: W (0.5)

H 558 H3-6 Do you perform tasks on probe resonant cavities  
H 559 H3-7 Do you perform tasks on loop resonant cavities  
H 560 H3-8 Do you perform tasks on aperture (iris/window) resonant cavities

27 40 22 13 27 8 12 0 0 0 1 26 15 17  
22 37 14 9 20 8 7 0 1 0 1 16 8 5  
18 32 10 4 8 6 10 0 0 0 0 11 9 5

0352 IX 2e. Given three question concerning lighthouse tubes, with four options each, select the option for each question which identifies a technique that allows the lighthouse tube to effectively operate in the UHF range IAW Student Text. Two of the three questions must be answered correctly. CTS: 27e Meas: W (1)

H 544 H2-3 Do you tune or adjust microwave oscillators or amplifiers

60 47 55 54 14 1 42 1 2 1 3 30 14 15



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 51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

Task Title

0353 IX 2f. Given pictorials of the two cavity klystron amplifier, two cavity klystron oscillator, and the three cavity klystron amplifier with their names indicated, and a list of statements describing a function of each klystron, match each klystron to a description IAW Student Text. Two out of the three must be matched correctly.  
 CTS: 43a Meas: W (.5/.5)

H 545 H2-4 Do you perform tasks on two-cavity klystron microwave oscillators and amplifiers 8 6 8 10 1 0 13 0 0 1 2 9 9 9  
 H 546 H2-5 Do you perform tasks on three-cavity klystron microwave oscillators and amplifiers 4 34 6 20 33 0 17 0 0 1 1 3 1 7

0354 IX 2g. Given a pictorial of a reflex klystron and three questions with four options each, select the option for each question that identifies reflex action in accomplishing the oscillator function IAW Student Text. Two out of three questions must be answered correctly. CTS: 43b Meas: W (0/1)

H 547 H2-6 Do you perform tasks on reflex klystron microwave oscillators and amplifiers 22 13 30 15 2 0 4 0 3 2 2 17 7 9

0355 IX 2h. Given a pictorial of traveling wave tube (TWT) and five questions pertaining to the function of TWT elements with four options per question, select the option for each question that describes the function of a selected element IAW Student Text. Three of the five must be answered correctly. CTS: 43c Meas: W (.5/.5)

H 548 H2-7 Do you perform tasks on traveling wave tube microwave oscillators and amplifiers 41 30 27 36 0 0 41 1 0 0 1 3 2 1

0356 IX 3. AM Systems 5.5/1.5

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Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0357 IX 3a. Given the names of the following types of transmitters: Amplitude Modulated (AM), Single Sideband (SSB), Pulse, and Frequency Modulated (FM) and statements describing types of transmission, match the name of each transmitter to its description IAW Student Text. Three out of the four matches must be correct. CTS: 29a, 30, 40, 41 Meas: W (0.5)

H 561 H4-1 Do you use "AM" modulation principles  
H 593 H4-33 Do you use "FM" modulation principles

41 14 18 11 59 59 14 2 0 1 2 47 48 49  
38 18 15 49 50 37 37 4 2 1 3 51 41 54

0358 IX 3b. Given a simple five stage receiver block with a letter identifying each stage and a list of statements pertaining to stage function, match the stage to its function IAW Student Text. Three of the five matches must be correct. CTS: 29a Meas: W (0.5)

H 562 H4-2 Do you trace block diagrams of AM transmitters

35 14 18 10 67 66 14 2 1 1 1 44 45 53

0359 IX 3c. Given a block diagram of an Amplitude Modulated (AM) Transmitter and four questions, one for each block pertaining to its function, with four options per question, select the option for each question that describes the function of the selected block IAW Student Text. Three of the four questions must be answered correctly. CTS: 29a Meas: W (1)

H 562 H4-2 Do you trace block diagrams of AM transmitters

35 14 18 10 67 66 14 2 1 1 1 44 45 53

0360 IX 3d. Given a schematic diagram of an AM Transmitter and a list of four statements identifying the purpose of Q1, Q2, Q3, Q4, and Q5, match each statement to the component it identifies IAW Student Text. Three of the four must be matched correctly. CTS: 29b Meas: W (3)

H 573 H4-13 Do you trace schematic diagrams of AM receiver subassemblies or circuit cards

28 12 12 8 35 71 11 3 0 1 1 51 31 32

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 51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

Task Title

0361 IX 3e. Given a block diagram of an Amplitude Modulated (AM) Receiver and eight questions, one for each stage pertaining to its function, with four options per question, select the option for each question that describes the function of the selected stage IAW Student Text. Five of the eight questions must be answered correctly. CTS: 19e, 29a Meas: W (1)

H 571 H4-11 Do you trace block diagrams of AM receivers 31 12 14 8 36 73 12 3 1 1 1 58 45 52

0362 IX 3f. Given a schematic diagram of an AM Receiver and a list of six major components: Q101, Q102, Q103, R101, Q104, Q105 and Q106, and a list of statements identifying the component purpose, match each component to its purpose IAW Student Text. Four of the six must be matched correctly. CTS: 29b Meas: W (.5/1.5)

H 573 H4-13 Do you trace schematic diagrams of AM receiver subassemblies or circuit cards 28 12 12 8 35 71 11 3 0 1 1 51 31 32

0363 IX 4. Single Sideband Systems 3.5/.5

0364 IX 4a. Given a block diagram of a Single Sideband (SSB) Transmitter and eight questions, one for each block pertaining, with four options per question, select the option for each question that identifies the function of the selected block IAW Student Text. Five of the eight questions must be answered correctly. CTS: 28d, 40 Meas: W (1.5/.5)

H 579 H4-19 Do you trace block diagrams of SSB transmitter subassemblies or circuit cards 3 6 2 20 9 60 6 0 0 0 1 28 24 20



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Task Title

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51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0369

IX 5c. Given a block diagram of a Pulse Radar Receiver and six questions, one for each block, pertaining to its function, with four options per question, select the option for each question that describes the function of the selected block IAW Student Text. Four out of the six questions must be answered correctly. CTS: 28e, 41 Meas: W

(.5/.5)

H 623

H4-63 Do you trace block diagrams of PM receivers

54 41 42 5 27 4 14 2 1 1 3 28 16 25

0370

IX 5d. Given a schematic diagram of a Pulse Radar Receiver and a list of six major components: Q101, Q102, Q103, CR101, Q104, and Q105, with statements identifying the purpose, match each component to the statement identifying its purpose IAW Student Text. Four of the six must be matched correctly. CTS: 28c, 41 Meas: W

(0/1)

H 625

H4-65 Do you trace schematic diagrams of PM receiver subassemblies or circuit cards

53 40 40 4 27 3 11 2 0 1 2 25 12 17

0371

IX 6. FM Systems

4/.5

0372

IX 6a. Given a block diagram of a Frequency Modulated (FM) Transmitter and six questions, one for each block pertaining to its functions, with four options per question, select the option for each question that describes the function of the selected block IAW Student Text. Four of the six questions must be answered correctly. CTS: 30 Meas: W

(.5/.5)

H 594

H4-34 Do you trace block diagrams of FM transmitters

39 22 18 58 56 38 42 4 4 2 2 54 41 55

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Task Title

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51	52	53	50	51	54	54	X1A	X1B	X1C	X2A	X2B	X2C

IX 6b. Given a schematic diagram of an FM Transmitter and a list of six major components: V13, V2, V1, V7, V10, and V12, with statements identifying the purpose, match each component to its purpose IAW Student Text. Your of the six must be matched correctly.

CTS: 30 Meas: W

**H 596 H4-36 Do you trace schematic diagrams of FM transmitter subassemblies or circuit cards**

0374 IX 6c. Given a block diagram of a Frequency Modulated (FM) Receiver and six questions, one for each block pertaining to its function, with four options per question, select the option for each question that describes the function of the selected block IAW Student Text. Four out of the six questions must be answered correctly. CTS: 30 Meas: W (1)

**H 604 H4-44 Do you trace block diagrams of FM receivers**

0375 IX 6d. Given a schematic diagram of an FM Receiver and a list of eight major components: Q101, Q102, Q103, CR1, CR2, Q104, Q105 and Q106, and a list of statements identifying the purpose, match each component to its purpose IAW Student Text. Five of the eight must be matched correctly. CTS: 30 Meas: W (1)

**0376 POI E3AQR30020 009 ELECTRONIC PRINCIPLES  
Volume 4 of 4 Volumes**

0377 X. Microcomputer Familiarization

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303 303 303 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

Task Title

0378 X 1. Introduction to Computers

6/2

0379 X 1a. Given a group of four questions, each question containing four options, select the option that defines a computer, IAW ST-KEP-100, for each question. Three of the four questions must be answered correctly.  
CTS: 45 Meas: W (0/2)

G 447 G2-1 Do you trace block or schematic diagrams of computer controlled or computer based systems 67 12 30 8 13 16 21 71 25 23 27 11 13 6  
G 455 G2-9 Do you perform tasks on digital computers 71 17 39 10 19 15 29 82 33 27 26 19 15 9

0380 X 1b. Given a list of three questions, each question containing four options, select the option that describes an application for a computer, IAW ST-KEP-100, for each question. Two of the three questions must be answered correctly.  
CTS: 45 Meas: W (1)

G 447 G2-1 Do you trace block or schematic diagrams of computer controlled or computer based systems 67 12 30 8 13 16 21 71 25 23 27 11 13 6  
G 455 G2-9 Do you perform tasks on digital computers 71 17 39 10 19 15 29 82 33 27 26 19 15 9

0381 X 1c. Given a list of terms, including Address, Address Bus, Data, Data Bus, Bit and Byte, and a list of six definitions, match each term to its definition, IAW ST-KEP-100. Four of the terms must be matched correctly. CTS: 45, 46a Meas: W (1)

G 447 G2-1 Do you trace block or schematic diagrams of computer controlled or computer based systems 67 12 30 8 13 16 21 71 25 23 27 11 13 6  
G 455 G2-9 Do you perform tasks on digital computers 71 17 39 10 19 15 29 82 33 27 26 19 15 9

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 Task Title

0382 X 1d. Given a block diagram of a computer, and a list of five questions, each question containing four options, select the option that identifies a function of a block, IAW ST-KEP-100, for each question. Three of the five questions must be answered correctly.  
 CTS: 45, 46a Meas: W (2)

G 447 G2-1 Do you trace block or schematic diagrams of computer controlled or computer based systems 67 12 30 8 13 16 21 71 25 23 27 11 13 6  
 G 455 G2-9 Do you perform tasks on digital computers 71 17 39 10 19 15 29 82 33 27 26 19 15 9

0383 X 1e. Given a list of four items, including the CT-60 computer, the WS-80 video terminal, the DC-8 cassette recorder, and the CT-81 fault display terminal, and a list of four descriptions, match each item with the correct description. Three of the four items must be matched correctly.  
 CTS: 46b Meas: W (2)

G 447 G2-1 Do you trace block or schematic diagrams of computer controlled or computer based systems 67 12 30 8 13 16 21 71 25 23 27 11 13 6  
 G 455 G2-9 Do you perform tasks on digital computers 71 17 39 10 19 15 29 82 33 27 26 19 15 9

0384 X 2. Introduction to Programming Languages 6/2

0385 X 2a. Given a group of four questions, each question containing four options, select the option that describes the purpose of a computer program, IAW ST-KEP-100, for each question. Three of the four questions must be answered correctly. CTS: 45 Meas: W (0/.5)

G 447 G2-1 Do you trace block or schematic diagrams of computer controlled or computer based systems 67 12 30 8 13 16 21 71 25 23 27 11 13 6  
 G 455 G2-9 Do you perform tasks on digital computers 71 17 39 10 19 15 29 82 33 27 26 19 15 9



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Task Title

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51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0386 X 2b. Given a group of three questions, each question containing four options, select the option that describes basic facts about Machine Language, IAW ST-KEP-100, for each question. Two of the three questions must be answered correctly. CTS: 45 Meas: W (0/.5)

G 464 G2-18 Do you use Machine computer language

27 5 5 0 7 2 8 36 4 4 2 3 0

0387 X 2c. Given a group of four questions, each question containing four options, select the option that identifies characteristics of assembly language, IAW ST-KEP-100, for each question. Three of the four questions must be answered correctly. CTS: 45 Meas: W (0/.5)

0388 X 2d. Given a group of three questions, each question containing four options, select the option that describes basic facts about high level languages, including FORTRAN and COBAL, IAW ST-KEP-100, for each question. Two of the three questions must be answered correctly. CTS: 45 Meas: W (0/.5)

G 457 G2-1 Do you use COBOL computer language  
G 458 G2-12 Do you use FORTRAN computer language

5 3 2 0 2 2 3 3 1 1 3 2 1 0  
5 3 10 0 2 1 3 7 1 1 2 2 1 0

0389 X 2e. Given a group of three questions, each question containing four options, select the option that describes basic facts about the BASIC Language, IAW ST-KEP-100, for each question. Two of the three questions must be answered correctly. CTS: 45 Meas: W (.5)

G 456 G2-10 Do you use Basic computer language

23 6 15 7 9 10 10 23 5 7 8 4 2 1

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Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0390 X 2f. Given a list of five BASIC Language Statements,  
and a list of five options, match each statement  
with the option describing that statement, IAW ST-KEP-  
100. Three of the five statements must be matched  
correctly. CTS: 45, 50b Meas: W (2.5)

G 456 G2-10 Do you use Basic computer language

23 6 15 7 9 10 10 23 5 7 8 4 2 1

0391 X 2g. Given a CT-60 Computer Training System, and a  
BASIC Language program, enter the program from the  
keyboard, using the instructions provided in SW-  
KEP-101. The program must be verified by the instructor  
to insure there are no more than three program entry  
errors. CTS: 46b Meas: PC, W (3)

G 448 G2-2 Do you load programs

69 13 34 6 12 15 30 74 21 17 20 10 9 6

0392 X 3. Memories

6.5/4

0393 X 3a. Given a group of four questions, each question  
containing four options, select the option that describes  
characteristics of a memory device, IAW ST-KEP-100,  
for each question. Three of the four questions must be  
answered correctly. CTS: 45 Meas: W (0/2)

G 466 G2-20 Do you perform tasks on magnetic (tape, disc, core)  
computer memories

59 10 33 3 13 15 22 81 24 15 17 10 7 7

G 467 G2-21 Do you perform tasks on semiconductor (RAM, ROM,  
EPROM, PROM) computer memories

58 10 22 9 13 12 16 65 13 14 13 9 8 1

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 Y Nbr

303 303 303 304 304 304 305 455 455 455 455 455 455  
 51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

Task Title

0394 X 3b. Given a group of four questions, each question containing four options, select the option that describes basic facts about Random Access Memories, IAW ST-KEP-100, for each question. Three of the four questions must be answered correctly. CTS: 45 Meas: W (2)

G 467 G2-21 Do you perform tasks on semiconductor (RAM, ROM, EPROM, PROM) computer memories 58 10 22 9 13 12 16 65 13 14 13 9 8 1

0395 X 3c. Given a group of four questions, each question containing four options, select the option that describes basic facts about Read Only Memories, IAW ST-KEP-100, for each question. Three of the four questions must be answered correctly. CTS: 45 Meas: W (4/1)

G 467 G2-21 Do you perform tasks on semiconductor (RAM, ROM, EPROM, PROM) computer memories 58 10 22 9 13 12 16 65 13 14 13 9 8 1

0396 X 3d. Given a group of four questions, each question containing four options, select the option that describes operation of Ferrite Core memories IAW ST-KEP-100, for each question. Three of the four questions must be answered correctly. CTS: 45 Meas: W (.5/1)

G 466 G2-20 Do you perform tasks on magnetic (tape, disc, core) computer memories 59 10 33 3 13 15 22 81 24 15 17 10 7 7

0397 X 4. Microprocessors and Microcomputers 9/2

0398 X 4a. Given a group of four questions, each question containing four options, select the option that describes a microprocessor chip, IAW ST-KEP-100, for each question. Three of the four questions must be answered correctly. CTS: 45, 47 Meas: W (2)

G 473 G2-27 Do you perform tasks on microprocessor computer terminals 18 6 13 2 8 11 11 52 4 3 7 3 3 1

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Task Title

303 303 303 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0399 X 4b. Given a group of four questions, each question containing four options, select the option that describes the organization of the 6800 microprocessor chip, IAW ST-KEP-100, for each question. Three of the four questions must be answered correctly.  
CTS: 47 Meas: W (2)

G 473 G2-27 Do you perform tasks on microprocessor computer terminals 18 6 13 2 8 11 11 52 4 3 7 3 3 1  
G 485 G2-39 Do you trace block or schematic diagrams of microprocessor controlled systems 38 7 18 8 11 17 16 52 7 9 9 6 9 2

0400 X 4c. Given a group of four questions, each question containing four options, select the option that describes the organization of the 8080 microprocessor chip, IAW ST-KEP-100, for each question. Three of the four questions must be answered correctly.  
CTS: 47 Meas: W (1.5/.5)

G 473 G2-27 Do you perform tasks on microprocessor computer terminals 18 6 13 2 8 11 11 52 4 3 7 3 3 1  
G 485 G2-39 Do you trace block or schematic diagrams of microprocessor controlled systems 38 7 18 8 11 17 16 52 7 9 9 6 9 2

0401 X 4d. Given a group of four questions, each question containing four options, select the option that describes the organization of the 9900 microprocessor chip, IAW ST-KEP-100, for each question. Three of the four questions must be answered correctly.  
CTS: 47 Meas: W (0/1)

G 473 G2-27 Do you perform tasks on microprocessor computer terminals 18 6 13 2 8 11 11 52 4 3 7 3 3 1  
G 485 G2-39 Do you trace block or schematic diagrams of microprocessor controlled systems 38 7 18 8 11 17 16 52 7 9 9 6 9 2

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303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0402 X 4e. Given a group of four questions, each question containing four options, select the option that describes the organization of the 280 microprocessor chip, IAW ST-KEP-100, for each question. Three of the four questions must be answered correctly.  
CTS: 47 Meas: W (3.5/.5)

G 473 G2-27 Do you perform tasks on microprocessor computer terminals 18 6 13 2 8 11 11 52 4 3 7 3 3 1  
G 485 G2-39 Do you trace block or schematic diagrams of microprocessor controlled systems 38 7 18 8 11 17 16 52 7 9 9 6 9 2

0403 X 5. Input/Output 5/2

0404 X 5a. Given a group of four questions, each question containing four options, select the option that describes basic facts about an I/O system, IAW ST-KEP-100, for each question. Three of the four questions must be answered correctly. CTS: 45 Meas: W (2)

G 455 G2-9 Do you perform tasks on digital computers 71 17 39 10 19 15 29 82 33 27 26 19 15 9

0405 X 5b. Given a group of four questions, each question containing four options, select the option that describes interfacing circuits, IAW ST-KEP-100, for each question. Three of the four questions must be answered correctly. CTS: 45 Meas: W (.5/1.5)

G 455 G2-9 Do you perform tasks on digital computers 71 17 39 10 19 15 29 82 33 27 26 19 15 9

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Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0406 X 5c. Given a group of four questions, each question containing four options, select the option that identifies the purpose of a device controller, IAW ST-KEP-100, for each question. Three of the four questions must be answered correctly.  
CTS: 45 Meas: W (1.5/.5)

G 455 G2-9 Do you perform tasks on digital computers 71 17 39 10 19 15 29 82 33 27 26 19 15 9

0407 X 5d. Given a group of four questions, each question containing four options, select the option that identifies operational characteristics of an I/O CHANNEL, IAW ST-KEP-100, for each question. Three of the four questions, must be answered correctly.  
CTS: 45 Meas: W (1)

G 455 G2-9 Do you perform tasks on digital computers 71 17 39 10 19 15 29 82 33 27 26 19 15 9

0408 X 6. Peripheral Equipment 5.5/2

0409 X 6a. Given a group of four questions, each containing four options, select the option that identifies operational characteristics of a Video Terminal, IAW ST-KEP-100, for each question. Three of the four questions must be answered correctly. CTS: 45 Meas: W (3)

G 474 G2-28 Do you perform tasks on video display unit (VDU/monitors) 27 8 23 5 13 11 18 74 10 6 13 4 3 1

0410 X 6b. Given a group of four questions, each question containing four options, select the option that identifies characteristics of a Magnetic Tape Unit, IAW ST-KEP-100, for each question. Three of the four questions must be answered correctly.  
CTS: 45 Meas: W (2)

G 472 G2-26 Do you perform tasks on magnetic tape drives 26 7 20 1 3 10 15 69 8 4 6 4 3 2



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Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0415 X 6g. Given a group of four questions, each question containing four options, select the option that identifies characteristics of a Modem, IAW ST-KEP-100, for each question. Three of the four questions must be answered correctly.  
CTS: 45 Meas: W (1.5)

G 479 G2-33 Do you perform tasks on modems

31 6 5 5 15 14 22 47 2 1 2 3 7 0

0416 X 7. Software and Programming

14/4

0417 X 7a. Given a group of four questions, each question containing four options, select the option that identifies characteristics of a software operating system, IAW ST-KEP-100, for each question. Three of the four questions must be answered correctly.  
CTS: 45 Meas: W (2)

G 455 G2-9 Do you perform tasks on digital computers

71 17 39 10 19 15 29 82 33 27 26 19 15 9

0418 X 7b. Given a group of four questions, each question containing four options, select the option that identifies characteristics of a compiler, IAW ST-KEP-100, for each question. Three of the four questions must be answered correctly.  
CTS: 45 Meas: W (1)

G 455 G2-9 Do you perform tasks on digital computers

71 17 39 10 19 15 29 82 33 27 26 19 15 9

0419 X 7c. Given a group of four questions, each question containing four options, select the option that identifies characteristics of an interpreted language, IAW ST-KEP-100, for each question. Three of the four questions must be answered correctly.  
CTS: 45 Meas: W (1)

G 456 G2-10 Do you use Basic computer language

23 6 15 7 9 10 10 23 5 7 8 4 2 1



PRTMOD

Keesler CETP AFSCs matched to Keesler EP POI (1 / 2) PM0039

Occupational Analysis Program  
USAFOMC (ATC) Randolph AFB TX

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Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0420 X 7d. Given a group of four questions, each question containing four options, select the option that identifies characteristics of a Utility program, IAW SI-KEP-100, for each question. Three of the four questions must be answered correctly.  
CTS: 45 Meas: W

(0/1)

G 455 G2-9 Do you perform tasks on digital computers

71 17 39 10 19 15 29 82 33 27 26 19 15 9

0421 X 7e. Given a group of ten questions, each question containing four options, select the option that identifies correct usage of the BASIC Language, IAW SI-KEP-100, for each question. Seven of the ten questions must be answered correctly.  
CTS: 50b Meas: W

(5/1)

G 449 G2-3 Do you write or debug programs

15 4 10 3 4 4 5 26 3 2 2 2 3 0

G 456 G2-10 Do you use Basic computer language

23 6 15 7 9 10 10 23 5 7 8 4 2 1

0422 X 7f. Given a problem, use the steps shown in SW-KEP-101 to construct a BASIC program to solve the problem. There must not be more than six errors in writing and entering the program.  
CTS: 50b, 46b Meas: PC

(5/2)

G 449 G2-3 Do you write or debug programs

15 4 10 3 4 4 5 26 3 2 2 2 3 0

0423 XI. Microprocessor and Assembly Language Programming

0424 XI 1. Internal Organization of the Microprocessor

10/3

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Task Title

303 303 303 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0425

XI la. Given four questions, each question containing four statements, select the statement that describes one of the phases of the instruction execution cycle, in accordance with ST CAP 110. Three out of four responses must be correct. CTS: 47 Meas: W (3/1)

G 485

G2-39 Do you trace block or schematic diagrams of microprocessor controlled systems

38 7 18 8 11 17 16 52 7 9 9 6 9 2

G 486

G2-40 Do you troubleshoot microprocessor controlled systems to a subassembly or circuit card

38 7 16 7 11 15 14 52 7 8 7 6 5 1

G 487

G2-41 Do you troubleshoot microprocessor controlled systems to isolate a faulty microprocessor

27 6 11 5 9 11 9 40 3 7 2 4 2 1

0426

XI lb. Given four questions, each question containing four statements, select the statement that describes a function of the Z-80 registers, in accordance with ST KEP 110. Three out of four responses must be correct. CTS: 47 Meas: W (0/2)

G 485

G2-39 Do you trace block or schematic diagrams of microprocessor controlled systems

38 7 18 8 11 17 16 52 7 9 9 6 9 2

G 486

G2-40 Do you troubleshoot microprocessor controlled systems to a subassembly or circuit card

38 7 16 7 11 15 14 52 7 8 7 6 5 1

0427

XI lc. Given four questions, each question containing four statements, select the statement that describes a function of the control section, in accordance with ST KEP 110. Three out of four responses must be correct. CTS: 47 Meas: W (3.5)

G 485

G2-39 Do you trace block or schematic diagrams of microprocessor controlled systems

38 7 18 8 11 17 16 52 7 9 9 6 9 2

G 486

G2-40 Do you troubleshoot microprocessor controlled systems to a subassembly or circuit card

38 7 16 7 11 15 14 52 7 8 7 6 5 1

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Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0428 XI 1d. Given four questions, each question containing four statements, select the statement that describes a function of the arithmetic logic unit, in accordance with ST KEP 110. Three out of four responses must be correct. CTS: 47 Meas: W (3.5)

G 485 G2-39 Do you trace block or schematic diagrams of microprocessor controlled systems  
G 486 G2-40 Do you troubleshoot microprocessor controlled systems to a subassembly or circuit card

38 7 18 8 11 17 16 52 7 9 9 6 9 2  
38 7 16 7 11 15 14 52 7 8 7 6 5 1

0429 XI 2. Monitor

3/2

0430 XI 2a. Given a list of monitor commands, (A, B, C, D, F), and a list of five statements, match each statement to the monitor command it describes in accordance with ST KEP 110. Three out of five monitor commands must be matched correctly. CTS: 50a Meas: W (1.0)

G 486 G2-40 Do you troubleshoot microprocessor controlled systems to a subassembly or circuit card

38 7 16 7 11 15 14 52 7 8 7 6 5 1

0431 XI 2b. Given a list of monitor commands, (G, H, I, J, K), and a list of five statements, match each statement to the monitor command it describes in accordance with ST KEP 110. Three out of five monitor commands must be matched correctly. CTS: 50a Meas: W (0.5)

G 486 G2-40 Do you troubleshoot microprocessor controlled systems to a subassembly or circuit card

38 7 16 7 11 15 14 52 7 8 7 6 5 1

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## Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0432 XI 2c. Given a list of monitor commands, (L, M, N, O, P), and a list of five statements, match each statement to the monitor command it describes in accordance with ST KEP 110. Three out of five monitor commands must be matched correctly. CTS: 50a Meas: W (0.5)

G 486 G2-40 Do you troubleshoot microprocessor controlled systems to a subassembly or circuit card 38 7 16 7 11 15 14 52 7 8 7 6 5 1

0433 XI 2d. Given a list of monitor commands, (Q, R, S, T, U), and a list of five statements, match each statement to the monitor command it describes in accordance with ST KEP 110. Three out of five monitor commands must be matched correctly. CTS: 50a Meas: W (0/1)

G 486 G2-40 Do you troubleshoot microprocessor controlled systems to a subassembly or circuit card 38 7 16 7 11 15 14 52 7 8 7 6 5 1

0434 XI 2e. Given a list of monitor commands, (V, W, X, Y, Z), and a list of five statements, match each statement to the monitor command it describes in accordance with ST KEP 110. Three out of five monitor commands must be matched correctly. CTS: 50a Meas: W (1/1)

G 486 G2-40 Do you troubleshoot microprocessor controlled systems to a subassembly or circuit card 38 7 16 7 11 15 14 52 7 8 7 6 5 1

0435 XI 3. Editor/Assembler 5

0436 XI 3a. Given a list of the four fields of an assembly language instruction, (LABEL, OP CODE, OPERAND, COMMENTS), and a list of four statements, match each statement to the field it describes in accordance with ST KEP 110. Three out of four must be matched correctly. CTS: 50a Meas: W (1.0)

G 449 G2-3 Do you write or debug programs 15 4 10 3 4 4 5 26 3 2 2 2 3

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Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0437 XI 3b. Given a list of the assembler directives ORG, END, EQU, DS, DB and a list of five statements, match each statement to the directive it describes in accordance with ST KEP 110. Three out of five must be matched correctly. CTS: 50a Meas: W (.5)

G 449 G2-3 Do you write or debug programs

15 4 10 3 4 4 4 5 26 3 2 2 2 3 0

0438 XI 3c. Given a list of the assembler commands FILE-, NAME-ADDRESS, LIST, DELT L1-L2, ASSM-ADDRESS, FILES and a list of five statements match the statement to the command it describes in accordance with ST KEP 110. Three out of five must be matched correctly. CTS: 50a Meas: W (1.5)

G 449 G2-3 Do you write or debug programs

15 4 10 3 4 4 4 5 26 3 2 2 2 3 0

0439 XI 3d. Given a list of the assembler error codes O, L, D, M, and V and a list of five statements, match each statement to the error code it describes, in accordance with ST KEP 110. Three out of five must be matched correctly. CTS: 50a Meas: W (.5)

G 449 G2-3 Do you write or debug programs

15 4 10 3 4 4 4 5 26 3 2 2 2 3 0

0440 XI 3e. Given a list of the assembler error codes U, S, R, and a list of three statements, match each statement to the error code it describes, in accordance with ST KEP 110. Two out of three must be matched correctly. CTS: 50a Meas: W (1.5)

G 449 G2-3 Do you write or debug programs

15 4 10 3 4 4 4 5 26 3 2 2 2 3 0

0441 XI 4. Assembly Language Programming

14/4

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Task Title:

303	303	303	304	304	304	305	455	455	455	455	455	455	455
51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C

0442 XI 4a. Given a group of ten questions, each question containing four responses, and HQ KEP 102, select the response which describes one of the data movement instructions in accordance with SY KEP 110. Seven out of ten questions must be answered correctly. CTS: 50b (5/2)

G 449	G2-3	Do you write or debug programs	15	4	10	3	4	4	4	5	26	3	2	2	2	3	0
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XI 4b. Given a group of ten questions, each question containing four responses, and HO KEP 102, select the response which describes one of the arithmetic instructions in accordance with ST KEP 110. Seven out of ten questions must be answered correctly. CTS: 50b  
Meas: W (13/2)

G 449	G2-3	Do you write or debug programs	15	4	10	3	4	4	5	26	3	2	2	2	3	0
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0444 XI 4c. Given a group of four questions, each question containing four responses, and HO KEP 102, select the response which describes one of the jump instructions in accordance with SI KEP 110. Three out of four questions must be answered correctly. CTS: 50b  
 Meas: W (4)

[illegible]

0445 XI 4d. Given a group of three questions, each question containing four responses, and HQ KEP 102, select the response which describes one of the subroutine instructions in accordance with SI KEP 110. Two out of three questions must be answered correctly. CIS: 50b  
 Meas: W (2)

G 449	G2-3	Do you write or debug programs
15	4	10
3	4	4
5	4	4
26	3	2
2	2	2
3	2	3
0		

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Task Title

303 303 303 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0446 XI 5. Program Development

14/6

0447 XI 5a. Given an assembly language program and ten questions, each question containing four responses, select the response that describes the function of selected program line(s) in accordance with ST KEP 110. Seven out of ten must be answered correctly. CTS: 50b Meas: W (10/4)

6 449 62-3 Do you write or debug programs

15 4 10 3 4 4 5 26 3 2 2 2 3 0

0448 XI 5b. Given a CT-60 computer training system and HQ KEP 102, write an assembly language program to print your name on the video display 10 times in accordance with SW KEP 111, with no more than six instructor assists. CTS: 50a, 50b Meas: PC (4/2)

6 449 62-3 Do you write or debug programs

15 4 10 3 4 4 5 26 3 2 2 2 3 0

0449 XII. System Hardware and Troubleshooting

0450 XII 1. CT-60 Computer Theory

22.5/6

0451 XII 1a. Given student handout HQ KEP 122, and ten questions, containing four options, select the option that describes any of the operations of the CT-804 board as described in ST KEP 120. Seven questions of the ten must be answered correctly. CTS: 46c Meas: W (8/4)

6 451 62-5 Do you troubleshoot computers to a subassembly or circuit card

67 10 27 6 15 10 22 78 26 14 21 12 8 1

6 486 62-40 Do you troubleshoot microprocessor controlled systems to a subassembly or circuit card

38 7 16 7 11 15 14 52 7 8 7 6 5 1

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Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0452 XII lb. Given student handout HQ KEP 122 and four questions, containing four options, select the option that describes any operation on the CT-804S board as described in ST KEP 120. Three questions of the four must be answered correctly. CTS: 46c Meas: W (3.5)

6 451 62-5 Do you troubleshoot computers to a subassembly or circuit card 67 10 27 6 15 10 22 78 26 14 21 12 8 1  
6 486 62-40 Do you troubleshoot microprocessor controlled systems to a subassembly or circuit card 38 7 16 7 11 15 14 52 7 8 7 6 5 1

0453 XII lc. Given student handout HQ KEP 122, and four questions, containing four options, select the option that describes any operation of the CT-805 board as described in ST KEP 120. Three of the four questions must be answered correctly. CTS: 46c Meas: W (2/2)

6 451 62-5 Do you troubleshoot computers to a subassembly or circuit card 67 10 27 6 15 10 22 78 26 14 21 12 8 1  
6 486 62-40 Do you troubleshoot microprocessor controlled systems to a subassembly or circuit card 38 7 16 7 11 15 14 52 7 8 7 6 5 1

0454 XII ld. Given a CT-60 Computer Training System, student handout HQ KEP 122 and a program listing, record the condition of the CONTROL-STATUS DISPLAY lights for each program cycle, with no more than five errors. CTS: 46b Meas: PC, W (3)

6 451 62-5 Do you troubleshoot computers to a subassembly or circuit card 67 10 27 6 15 10 22 78 26 14 21 12 8 1  
6 486 62-40 Do you troubleshoot microprocessor controlled systems to a subassembly or circuit card 38 7 16 7 11 15 14 52 7 8 7 6 5 1

0455 XII le. Given a CT-60 Computer Training System, an oscilloscope and student handout HQ KEP 122, complete a graph showing time relationships within the CT-60 computer IAW SW KEP 121. Times must be within 20% of the instructor determined results. CTS: 46c Meas: PC, W (6)

6 451 62-5 Do you troubleshoot computers to a subassembly or circuit card 67 10 27 6 15 10 22 78 26 14 21 12 8 1



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Task Title

G 486 G2-40 Do you troubleshoot microprocessor controlled systems to a subassembly or circuit card

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C  
38 7 16 7 11 15 14 52 7 8 7 6 5 1

0456 XII 2. CT-81 Fault Display Terminal

4/4

0457 XII 2a. Given student handout H0 KEP 122, and four questions, containing four options, select the option that describes functional operation of the CT-81 Fault Display Panel as described in ST KEP 120. Three of the four questions must be answered correctly. CTS: 46c Meas: W

G 451 G2-5 Do you troubleshoot computers to a subassembly or circuit card  
G 486 G2-40 Do you troubleshoot microprocessor controlled systems to a subassembly or circuit card

67 10 27 6 15 10 22 78 26 14 21 12 8 1  
38 7 16 7 11 15 14 52 7 8 7 6 5 1

0458 XII 3. Video Terminal

4.5/2

0459 XII 3a. Given four questions, containing four options, and student handout H0 KEP 122, select the option that describes basic facts about how a video display is formed, IAW ST KEP 120. Three of the four questions must be answered correctly. CTS: 46c Meas: W (3.5/.5)

G 451 G2-5 Do you troubleshoot computers to a subassembly or circuit card  
G 474 G2-28 Do you perform tasks on video display unit (VDU/monitors)  
G 486 G2-40 Do you troubleshoot microprocessor controlled systems to a subassembly or circuit card

67 10 27 6 15 10 22 78 26 14 21 12 8 1  
27 8 23 5 13 11 18 74 10 6 13 4 3 1  
38 7 16 7 11 15 14 52 7 8 7 6 5 1

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## Task Title

303 303 303 304 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0460 XII 3b. Given four questions, containing four options, and student handout H0 KEP 122, select the option that describes basic facts about the control circuits of a video terminal, IAW ST KEP 120. Three of the four questions must be answered correctly. CTS: 46c  
Meas: W (0/1)

G 451 G2-5 Do you troubleshoot computers to a subassembly or circuit card  
G 474 G2-28 Do you perform tasks on video display unit (VDU/monitors)  
G 486 G2-40 Do you troubleshoot microprocessor controlled systems to a subassembly or circuit card

67 10 27 6 15 10 22 78 26 14 21 12 8 1  
27 8 23 5 13 11 18 74 10 6 13 4 3 1  
38 7 16 7 11 15 14 52 7 8 7 6 5 1

0461 XII 3c. Given four questions, containing four options, and student handout H0 KEP 122, select the option that describes basic facts about a keyboard encoder, IAW ST KEP 120. Three of the four questions must be answered correctly. CTS: 46c Meas: W (1/.5)

G 470 G2-24 Do you perform tasks on computer keyboards  
G 506 G3-19 Do you perform tasks on encoders

50 13 38 8 23 21 34 82 15 11 20 9 11 3  
62 39 27 27 29 15 36 42 7 11 8 20 11 14

0462 XII 4. Troubleshooting 27/8

0463 XII 4a. Given student handout H0 KEP 122, and four questions, containing four options, select the option that describes general troubleshooting techniques used with the CT-60 Computer Training System, IAW ST KEP 120. Three of the four questions must be answered correctly. CTS: 46d Meas: W (3.5)

G 451 G2-5 Do you troubleshoot computers to a subassembly or circuit card  
G 452 G2-6 Do you troubleshoot computer subassembly or circuit card to circuit level components or IC

67 10 27 6 15 10 22 78 26 14 21 12 8 1  
32 8 15 4 8 5 7 53 11 5 6 6 1 1

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Y Nbr

## Task Title

303 303 303 304 304 304 305 455 455 455 455 455 455  
51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

0464 XII 4b. Given student handout HO KEP 122, and four questions, containing four options, and malfunction symptoms, select the option that describes a data-in malfunction, IAW ST KEP 120. Three of the four questions must be answered correctly. CTS: 46d Meas: W (2/2)

G 451	G2-5 Do you troubleshoot computers to a subassembly or circuit card	67	10	27	6	15	10	22	78	26	14	21	12	8	1
G 452	G2-6 Do you troubleshoot computer subassembly or circuit card to circuit level components or IC	32	8	15	4	8	5	7	53	11	5	6	6	1	1

0465 XII 4c. Given a CT-60 Computer Training System with four individually inserted data-in malfunctions, an oscilloscope, and student handout ST KEP 122, isolate each malfunction. Three of the four malfunctions must be isolated correctly. CTS: 46d Meas: PC, W (3)

G 451	G2-5 Do you troubleshoot computers to a subassembly or circuit card	67	10	27	6	15	10	22	78	26	14	21	12	8	1
G 452	G2-6 Do you troubleshoot computer subassembly or circuit card to circuit level components or IC	32	8	15	4	8	5	7	53	11	5	6	6	1	1

0466 XII 4d. Given student handout HO KEP 122, four questions, containing four options, and malfunction symptoms, select the option that describes a data-out malfunction, IAW ST KEP 120. Three of the four questions must be answered correctly. CTS: 46d Meas: W (2.5/1)

G 451	G2-5 Do you troubleshoot computers to a subassembly or circuit card	67	10	27	6	15	10	22	78	26	14	21	12	8	1
G 452	G2-6 Do you troubleshoot computer subassembly or circuit card to circuit level components or IC	32	8	15	4	8	5	7	53	11	5	6	6	1	1

0467 XII 4e. Given CT-60 Computer Training System with four individually inserted data-out malfunctions, an oscilloscope and student handout HO KEP 122, isolate each malfunction. Three of the four malfunctions must be isolated correctly. CTS: 46d Meas: PC, W (3)

G 451	G2-5 Do you troubleshoot computers to a subassembly or circuit card	67	10	27	6	15	10	22	78	26	14	21	12	8	1
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G 452			62-6 Do you troubleshoot computer subassembly or circuit card to circuit level components or IC	32	8	15	4	8	5	7	53	11	5	6	6	1	1

0468 XII 4f. Given four questions, containing four options, student handout HO KEP 122, and malfunction symptoms, select the option that describes an address malfunction, IAW ST KEP 120. Three of the four questions must be answered correctly. CTS: 46d Meas: W (3/1)

G 451			62-5 Do you troubleshoot computers to a subassembly or circuit card	67	10	27	6	15	10	22	78	26	14	21	12	8	1
G 452			62-6 Do you troubleshoot computer subassembly or circuit card to circuit level components or IC	32	8	15	4	8	5	7	53	11	5	6	6	1	1

0469 XII 4g. Given CT-60 Computer Training System with four individually inserted address malfunctions, student handout HO KEP 122, and an oscilloscope, isolate the malfunction. Three of the four malfunctions must be isolated correctly. CTS: 46d Meas: PC, W (3)

G 451			62-5 Do you troubleshoot computers to a subassembly or circuit card	67	10	27	6	15	10	22	78	26	14	21	12	8	1
G 452			62-6 Do you troubleshoot computer subassembly or circuit card to circuit level components or IC	32	8	15	4	8	5	7	53	11	5	6	6	1	1

0470 XII 4h. Given three questions, containing four options, student handout HO KEP 122, and malfunction symptoms, select the option that describes a control signal malfunction, IAW ST KEP 120. Two of the three questions must be answered correctly. CTS: 46d Meas: W (0/4)

G 451			62-5 Do you troubleshoot computers to a subassembly or circuit card	67	10	27	6	15	10	22	78	26	14	21	12	8	1
G 452			62-6 Do you troubleshoot computer subassembly or circuit card to circuit level components or IC	32	8	15	4	8	5	7	53	11	5	6	6	1	1

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51 52 53 50 51 54 56 54 X1A X1B X1C X2A X2B X2C

Task Title

0471 XII 4i. Given CT-60 Computer Training System with three individually inserted control signal malfunctions, student handout HO KEP 122, and an oscilloscope, isolate each malfunction. Two of the three malfunctions must be isolated correctly. CTS: 46d Meas: PC, W (3)

G 451	G2-5 Do you troubleshoot computers to a subassembly or circuit card	67	10	27	6	15	10	22	78	26	14	21	12	8	1
G 452	G2-6 Do you troubleshoot computer subassembly or circuit card to circuit level components or IC	32	8	15	4	8	5	7	53	11	5	6	6	1	1

0472 XII 4j. Given CT-60 Computer Training System with three individually inserted malfunctions, an oscilloscope, and student handout HO KEP 122, isolate each malfunction. Two of the three malfunctions must be isolated correctly. CTS: 46c, 46d Meas: PC, W (4)

G 451	G2-5 Do you troubleshoot computers to a subassembly or circuit card	67	10	27	6	15	10	22	78	26	14	21	12	8	1
G 452	G2-6 Do you troubleshoot computer subassembly or circuit card to circuit level components or IC	32	8	15	4	8	5	7	53	11	5	6	6	1	1

Tasks not referenced

A 16	Al-16 Do you troubleshoot circuits to isolate a faulty relay	91	81	88	81	91	85	59	70	96	88	85	93	89	93
A 17	Al-17 Do you adjust relays	41	55	50	46	55	44	26	31	21	18	14	39	25	17
A 18	Al-18 Do you perform tasks on contacts, cores, coils, armatures, or springs	47	59	58	44	62	60	29	37	29	24	19	46	29	32
A 19	Al-19 Do you continuity check relays	86	75	83	68	82	80	56	57	84	76	78	88	79	96
A 25	Al-25 Do you calibrate or adjust circuits by using variable inductors	69	56	57	49	68	67	28	25	11	14	12	58	32	34
A 34	Al-34 Do you use capacitor color codes in your present job	29	30	41	20	31	26	14	16	10	9	9	20	14	10
A 36	Al-36 Do you troubleshoot circuits to isolate a faulty transformer	86	80	88	77	88	81	56	65	56	63	55	79	53	55
A 39	Al-39 Do you calibrate or adjust circuits using variable transformers	51	53	49	40	48	47	34	20	15	17	10	39	26	22
A 43	Al-43 Do you troubleshoot circuits to isolate a faulty three phase transformer	72	65	62	41	63	40	39	30	30	43	33	42	25	31
A 44	Al-44 Do you adjust three phase transformers	41	45	41	26	29	26	30	14	9	11	9	22	11	10
A 45	A2-1 Do you trace schematic or block diagrams of circuits containing DC motors	72	55	76	25	46	61	58	53	58	53	43	70	46	45

D	T Task	Task Title	303	303	304	304	304	304	305	455	455	455	455	455	455	455
Y Nbr			51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C
A 46	A2-2	Do you troubleshoot circuits to isolate a faulty DC motor	70	52	74	23	44	59	54	52	56	46	34	69	42	39
A 47	A2-3	Do you troubleshoot DC motor component parts	37	34	51	14	22	33	29	21	20	17	14	24	18	9
A 48	A2-4	Do you perform tasks on DC motor component parts	35	34	45	14	19	30	29	22	17	15	12	22	13	9
A 49	A2-5	Do you trace schematic or block diagrams of circuits containing AC motors	68	71	73	28	65	55	47	46	55	54	41	62	39	43
A 50	A2-6	Do you troubleshoot circuits to isolate a faulty AC motor	65	68	72	26	60	53	42	45	53	48	33	60	34	36
A 51	A2-7	Do you troubleshoot AC motor component parts	36	41	49	14	29	30	21	20	16	17	9	19	9	7
A 52	A2-8	Do you perform tasks on AC motor component parts	37	40	47	14	26	27	22	20	13	17	9	17	9	7
A 53	A2-9	Do you trace schematic or block diagrams of circuits containing DC generators	16	24	38	11	12	13	15	9	32	28	26	18	10	10
A 54	A2-10	Do you troubleshoot to isolate a faulty DC generator	15	23	37	12	12	12	12	8	29	24	17	15	8	8
A 55	A2-11	Do you troubleshoot DC generator component parts	12	20	29	7	7	9	6	5	10	5	7	9	5	3
A 56	A2-12	Do you perform tasks on component parts of DC generators	12	19	28	8	7	9	6	5	10	7	7	9	5	3
A 57	A2-13	Do you trace schematic or block diagrams of circuits containing AC generators	14	23	45	11	9	12	15	8	31	27	28	15	7	10
A 58	A2-14	Do you troubleshoot circuits to isolate a faulty AC generator	15	23	43	10	9	12	15	7	28	22	19	13	6	9
A 59	A2-15	Do you troubleshoot AC generator component parts	10	18	34	7	4	9	7	4	10	6	8	8	3	2
A 60	A2-16	Do you perform tasks on component parts of AC generators	11	18	34	8	5	8	8	4	8	7	8	8	3	2
A 61	A2-17	Do you trace schematic or block diagrams of circuits containing alternators	4	4	8	4	2	5	6	2	4	2	5	4	3	3
A 62	A2-18	Do you troubleshoot circuits to isolate a faulty alternator	4	3	7	4	2	4	5	1	4	2	3	3	1	2
A 63	A2-19	Do you troubleshoot alternator component parts	3	3	8	2	2	3	2	1	2	1	2	2	1	0
A 64	A2-20	Do you perform tasks on component parts of alternators	3	3	5	2	2	3	2	1	1	1	2	2	1	0
A 65	A2-21	Do you trace schematic or block diagrams of circuits containing synchros or servos	73	71	83	18	16	53	58	34	88	87	76	66	49	51
A 66	A2-22	Do you troubleshoot circuits to isolate a faulty synchro or servo	71	70	83	17	16	51	55	33	88	81	68	65	43	43
A 67	A2-23	Do you troubleshoot synchro or servo component parts	57	50	66	10	10	33	38	18	42	41	33	32	21	13
A 68	A2-24	Do you perform tasks on component parts of synchros or servos	55	47	63	13	9	31	34	17	33	37	22	27	16	13
A 69	A2-25	Do you trace schematic or block diagrams of circuits containing choppers	10	19	18	4	5	14	6	4	13	16	13	26	10	16
A 70	A2-26	Do you troubleshoot circuits to isolate a faulty chopper	9	19	16	3	4	14	5	4	12	12	10	25	6	16
A 71	A2-27	Do you measure chopper coil excitation frequency	5	15	11	2	3	9	3	2	7	2	6	11	4	8
A 72	A2-28	Do you measure chopper coil voltage-current phase relationship	5	14	11	2	3	7	3	3	7	2	5	10	3	8
A 73	A2-29	Do you trace schematic or block diagrams of circuits containing transducers	14	11	13	14	6	14	11	19	52	54	42	13	5	8
A 74	A2-30	Do you troubleshoot circuits to isolate a faulty transducer	12	9	10	13	5	14	9	19	50	53	38	13	3	7
A 75	A2-31	Do you calibrate or adjust transducers	9	8	7	9	1	11	6	14	24	20	15	7	1	0
A 76	A2-32	Do you repair, clean or lubricate transducers	9	8	8	10	3	13	7	14	15	15	12	7	1	0

Task Title	303	303	303	304	304	304	304	304	305	455	455	455	455	455	455
A 77 A2-33 Do you trace schematic or block diagrams of circuits containing solenoids	26	18	41	16	9	39	29	35	50	50	47	41	30	17	
A 78 A2-34 Do you troubleshoot circuits to isolate a faulty solenoid	24	17	39	15	8	38	27	35	48	43	40	28	15		
A 79 A2-35 Do you perform maintenance on solenoid component parts	15	12	30	9	5	29	18	19	17	12	12	12	11	7	
A 80 A2-36 Do you trace schematic or block diagrams of circuits containing meter movements	78	63	72	59	73	71	58	27	47	53	40	47	35	28	
A 81 A2-37 Do you troubleshoot circuits to isolate a faulty meter movement	74	61	69	57	71	69	57	25	44	50	34	46	34	28	
A 82 A2-38 Do you perform maintenance on meter movement mechanical parts	41	33	45	29	43	35	30	14	16	16	15	17	10	3	
A 83 A3-1 Do you trace schematic or block diagrams of circuits containing diodes	93	81	80	86	93	86	69	78	69	75	65	84	70	79	
A 84 A3-2 Do you troubleshoot circuits to isolate a faulty diode	91	81	78	83	92	84	59	72	59	56	50	79	58	62	
A 85 A3-3 Do you check diodes using an ohmmeter	92	80	78	83	88	83	56	73	58	54	49	81	59	63	
A 88 A3-6 Do you use diode color codes	20	18	24	15	16	20	15	15	13	8	10	18	14	11	
A 92 A3-10 Do you check transistors using transistor testers	63	60	54	56	65	57	25	44	8	7	8	42	22	22	
A 94 A3-12 Do you use transistor substitution information	51	47	44	38	37	56	16	41	9	7	9	33	18	21	
A 95 A3-13 Do you trace schematic or block diagrams of circuits containing integrated circuits (IC)	91	61	63	65	85	77	55	75	36	41	34	60	48	57	
A 96 A3-14 Do you troubleshoot circuits to isolate a faulty IC	84	59	59	57	68	71	41	66	27	20	22	45	28	30	
A 97 A3-15 Do you use IC substitution information	45	37	43	32	27	43	18	42	12	8	7	20	10	20	
A 98 A3-16 Do you trace schematic or block diagrams of circuits containing solid-state special purpose devices	76	58	56	58	58	69	52	53	17	20	21	51	32	36	
A 99 A3-17 Do you troubleshoot circuits to isolate a faulty solid-state special purpose device	72	55	53	54	52	66	43	50	14	14	16	45	24	23	
A 103 A3-21 Do you perform tasks on unijunction transistors (UJT)	45	36	28	33	50	50	10	25	3	3	3	32	22	22	
A 105 A3-23 Do you perform tasks on liquid crystal displays (LCD)	47	39	33	30	35	52	28	29	9	12	9	27	16	20	
A 106 A3-24 Do you perform tasks on pin diodes	69	39	27	23	28	39	34	13	3	4	2	11	11	5	
A 108 A3-26 Do you perform tasks on fantail transistors	12	7	10	10	12	22	7	8	2	1	1	6	6	1	
A 110 A3-28 Do you perform tasks on triacs	18	9	11	12	18	15	8	13	2	3	3	8	7	3	
A 111 A3-29 Do you perform tasks on programmable unijunction transistors (PUT)	8	5	8	8	7	9	4	5	1	1	1	4	3	2	
A 112 A3-30 Do you perform tasks on silicon controlled switches (SCS)	18	15	13	12	14	15	11	9	4	5	3	10	5	2	
A 113 A3-31 Do you perform tasks on silicon unilateral switches (SUS)	9	6	8	8	4	8	6	4	2	2	2	3	2	1	
A 114 A3-32 Do you perform tasks on step recovery diodes (SRD)	8	6	6	6	5	7	7	3	1	1	3	5	3	1	
A 115 A3-33 Do you perform tasks on field effect diodes (FED)	29	21	22	11	20	23	16	16	4	7	5	18	14	9	
A 116 A3-34 Do you perform tasks on DIAC (Bi-directional trigger diode)	8	5	7	8	4	7	4	4	2	3	1	4	5	2	
A 117 A3-35 Do you perform tasks on varistors	49	27	30	33	36	40	24	28	5	11	5	29	20	24	
A 118 A3-36 Do you perform tasks on metal oxide varistors (MOV)	10	7	10	10	4	11	4	5	1	1	2	5	5	1	
A 119 A3-37 Do you perform tasks on schottky diodes	22	11	15	11	16	9	7	12	2	5	3	8	9	3	
A 120 A4-1 Do you trace block diagrams of circuits containing electron tubes	76	82	66	49	75	67	46	15	21	29	14	63	37	45	
A 121 A4-2 Do you trace schematic diagrams of electron tube circuits	73	79	65	45	74	67	39	13	19	26	12	62	34	40	
A 122 A4-3 Do you troubleshoot circuits to isolate a faulty electron tube	72	82	63	49	73	67	39	14	21	25	12	61	34	38	

D T Y	Task Nbr	Task Title	303 51	303 52	303 53	304 50	304 51	304 54	304 56	305 54	455 X1A	455 X1B	455 X1C	455 X2A	455 X2B	455 X2C
A	123	A4-4 Do you use electron tube characteristic curves	21	26	18	10	18	16	20	2	4	4	1	13	9	7
A	124	A4-5 Do you use electron tube substitution manuals or charts	44	48	48	14	44	39	8	4	10	12	5	28	18	15
A	130	A4-11 Do you perform tasks on gas tubes	50	65	47	13	61	21	8	2	6	9	3	32	20	16
A	131	A4-12 Do you perform tasks on phantastrons	10	30	38	4	6	4	2	0	6	2	1	22	14	9
A	132	A4-13 Do you perform tasks on neon tubes	18	21	16	8	25	11	3	2	2	2	1	12	9	9
A	133	A4-14 Do you perform tasks on xenon tubes	5	6	6	3	8	4	3	4	1	1	1	6	3	2
A	134	A4-15 Do you perform tasks on nixie tubes	9	10	23	11	56	18	5	5	2	2	1	7	8	5
A	135	A4-16 Do you trace block diagrams of circuits containing cathode ray tubes (CRT)	90	83	68	25	17	22	14	53	13	4	9	44	29	32
A	136	A4-17 Do you trace schematic diagrams of CRT circuits	87	80	69	24	15	20	12	49	11	4	6	42	26	26
A	137	A4-18 Do you troubleshoot to isolate a faulty CRT	88	79	65	24	15	20	12	54	14	4	5	43	26	23
A	138	A4-19 Do you adjust or calibrate circuits that control CRT operations	87	81	68	23	20	22	14	55	10	4	3	42	24	24
A	144	A5-4 Do you solder or desolder multi-layer circuit board connections	42	32	29	35	29	49	23	30	20	12	10	35	16	15
A	145	A5-5 Do you perform high reliability soldering	70	65	68	62	69	65	45	61	57	48	52	61	43	57
A	146	A5-6 Do you use crimping tool to repair or make connections	90	82	78	85	89	91	79	79	98	96	89	96	96	99
A	147	A5-7 Do you use wire wrap tool to make connections	67	45	37	63	40	52	49	59	32	26	24	30	24	32
A	148	A5-8 Do you use punch-on tool to make connections	32	31	22	52	30	53	19	28	20	12	19	16	11	23
A	150	A5-10 Do you repair or fabricate connectors or cables on coaxial cables	93	86	85	88	93	92	85	48	75	65	73	96	92	99
A	151	A5-11 Do you repair or fabricate connectors or cables on triaxial cables	36	53	18	28	25	24	40	17	21	10	13	27	16	28
A	152	A5-12 Do you repair or fabricate connectors or cables on ribbon cables	31	21	20	20	12	37	17	54	9	5	6	15	11	11
B	155	B1-3 Do you use the multimeter to extend the range of voltmeters using external shunts	36	30	49	33	46	29	34	24	24	18	20	32	26	25
B	157	B1-5 Do you use the multimeter to measure AC current values	76	70	73	70	67	56	72	60	60	60	56	70	57	56
B	158	B1-6 Do you use the multimeter to extend the range of ammeters using external shunts	24	22	34	19	25	19	24	16	16	13	15	21	16	16
B	162	B2-2 Do you use the oscilloscope to measure time (rise, fall, pulse width, etc)	94	88	87	63	94	57	65	86	33	38	27	72	51	52
B	166	B2-6 Do you use the oscilloscope to measure phase jitters	59	51	52	33	68	20	31	35	13	12	13	34	18	18
B	167	B2-7 Do you use the oscilloscope to observe signal/data patterns	83	75	69	69	73	57	67	80	27	27	19	64	47	49
B	168	B2-8 Do you use the oscilloscope to observe lissajous patterns	60	21	34	18	29	20	16	29	10	13	15	30	19	17
B	171	B2-11 Do you use delay time multipliers with oscilloscopes	70	51	38	22	65	20	27	32	14	16	11	39	19	30
B	172	B3-1 Do you use signal generators (SG) to perform operational checks	90	73	74	75	82	84	66	43	25	11	22	77	60	54
B	173	B3-2 Do you use SG to perform alignments, adjustments, or calibrations	90	73	76	74	81	81	65	44	21	9	14	78	48	52
B	174	B3-3 Do you use SG to troubleshoot circuits	82	60	65	69	67	79	61	40	16	9	16	71	47	48
B	176	B3-5 Do you use audio non-sinusoidal signal generators	10	13	12	19	13	29	12	9	5	0	3	25	14	8
B	177	B3-6 Do you use RF less than 1,000MH signal generators	35	43	38	53	54	70	56	10	7	5	7	58	47	37
B	178	B3-7 Do you use RF greater than 1,000MH signal generators	75	53	63	57	44	33	49	6	4	1	5	48	28	25
B	179	B3-8 Do you use white noise signal generators	9	6	9	25	6	10	5	1	0	3	4	5	6	6
B	180	B3-9 Do you use pattern signal generators	15	12	11	19	9	13	25	14	2	0	4	8	7	10



D	T	Task Y Nbr	Task Title
B	B	B 181	B3-10 Do you use pseudo-random signal generators
B	B	B 182	B3-11 Do you use time mark signal generators
B	B	B 184	B3-13 Do you use TV signal signal generators
B	B	B 185	B4-1 Do you use frequency counters
B	B	B 186	B4-2 Do you use spectrum analyzers
B	B	B 187	B4-3 Do you use field strength testers
B	B	B 189	B4-5 Do you use digital logic probes
B	B	B 190	B4-6 Do you use capacitance testers
B	B	B 191	B4-7 Do you use capacitor substitution boxes
B	B	B 192	B4-8 Do you use DC restorers (CRT rejuvenators)
B	B	B 193	B4-9 Do you use logic current tracers
B	B	B 194	B4-10 Do you use tube testers
B	B	B 195	B4-11 Do you use logic pulsers
B	B	B 196	B4-12 Do you use logic analyzers
B	B	B 197	B4-13 Do you use signature analyzers
B	B	B 198	B4-14 Do you use reflectometers
C	C	C 199	C1-1 Do you trace block diagrams of circuits containing transistor amplifiers
C	C	C 201	C1-3 Do you troubleshoot to isolate a faulty transistor amplifier
C	C	C 204	C1-6 Do you adjust or align transistor amplifiers
C	C	C 207	C1-9 Do you work on compound-connected (Darlington Pair) transistor amplifiers
C	C	C 208	C1-10 Do you work on cascade-connected transistor amplifiers
C	C	C 211	C1-13 Do you work on audio transistor amplifiers
C	C	C 212	C1-14 Do you work on wideband transistor amplifiers
C	C	C 213	C1-15 Do you work on IF transistor amplifiers
C	C	C 217	C1-19 Do you work on DC transistor amplifiers (switching applications)
C	C	C 218	C2-1 Do you trace schematic diagrams of amplifier stabilization circuits
C	C	C 224	C2-7 Do you perform tasks on double diode stabilization amplifiers
C	C	C 225	C3-1 Do you trace block diagrams of circuits containing coupling circuits
C	C	C 233	C3-9 Do you perform tasks on optical coupling circuits
C	C	C 234	C4-1 Do you trace block diagrams of circuits containing electron tube amplifiers
C	C	C 236	C4-3 Do you troubleshoot to isolate a faulty electron tube amplifier
C	C	C 237	C4-4 Do you troubleshoot electron tube amplifiers to circuit level components
C	C	C 238	C4-5 Do you troubleshoot electron tube amplifier distortion
C	C	C 239	C4-6 Do you adjust or align electron tube amplifiers
C	C	C 240	C4-7 Do you measure electron tube amplifier voltage, current, or power gain
C	C	C 241	C4-8 Do you calculate values of electron tube amplifier voltage, current, or power gain

D T Y	Task Nbr	Task Title	303 51	303 52	303 53	304 50	304 51	304 54	304 56	305 54	455 X1A	455 X1B	455 X1C	455 X2A	455 X2B	455 X2C
C	242	C4-9 Do you perform tasks on paraphase electron tube amplifiers	9	17	19	3	6	20	3	0	0	1	1	18	12	11
C	243	C4-10 Do you perform tasks on push-pull electron tube amplifiers	29	46	30	10	46	42	5	2	4	4	1	36	21	20
C	244	C4-11 Do you perform tasks on audio electron tube amplifiers	9	10	15	13	40	43	4	1	2	2	2	39	23	20
C	245	C4-12 Do you perform tasks on voltage regulator electron tube amplifiers	38	58	41	13	58	37	16	4	5	8	3	39	23	21
C	246	C4-13 Do you perform tasks on common grid electron tube amplifiers	37	53	35	12	49	37	13	2	6	9	2	34	20	21
C	247	C4-14 Do you perform tasks on common cathode electron tube amplifiers	40	57	36	14	50	39	15	3	6	9	2	33	19	18
C	248	C4-15 Do you perform tasks on cathode follower electron tube amplifiers	40	60	40	12	63	38	7	2	4	7	2	38	22	20
C	249	C5-1 Do you trace block or schematic diagrams of circuits containing operational amplifiers (op amps)	83	62	55	45	71	61	40	50	22	20	28	35	29	21
C	250	C5-2 Do you troubleshoot to isolate a faulty op amp circuit	77	59	56	41	64	58	30	44	14	14	19	31	19	16
C	252	C5-4 Do you adjust op amp bias, offsets, or drift	58	44	39	30	43	38	23	25	7	7	9	17	12	7
C	258	C5-10 Do you use or apply operational amplifiers as oscillators	58	37	38	28	54	37	23	26	8	8	6	27	17	17
C	259	C5-11 Do you use or apply operational amplifiers as integrators	49	31	39	12	39	22	14	16	8	8	11	15	9	8
C	260	C5-12 Do you use or apply operational amplifiers for differentiators	56	35	44	19	44	29	13	23	6	6	6	16	9	8
C	261	C5-13 Do you use or apply operational amplifiers for power supplies (voltage regulators)	71	58	51	38	60	45	32	42	20	16	19	31	18	18
C	262	C5-14 Do you use or apply operational amplifiers as analog/digital (A/D) digital/analog (D/A) converters	73	50	44	24	47	33	26	36	10	11	11	26	18	16
C	263	C5-15 Do you use or apply operational amplifiers as multivibrators	65	48	40	23	57	35	15	29	9	11	8	31	16	15
C	264	C5-16 Do you use or apply operational amplifiers as modulators/demodulators	60	35	38	26	46	40	31	24	10	10	9	25	16	16
C	265	C6-1 Do you trace block diagrams of circuits containing magnetic amplifiers	15	9	20	4	15	3	7	5	6	11	6	5	4	8
C	266	C6-2 Do you trace schematic diagrams of magnetic amplifier circuits	15	8	20	4	14	3	6	5	5	7	6	5	4	7
C	267	C6-3 Do you troubleshoot to isolate a faulty magnetic amplifier	15	6	20	4	11	3	5	5	4	8	4	5	3	3
C	268	C6-4 Do you troubleshoot magnetic amplifiers to circuit level components	12	5	17	3	9	3	4	4	2	2	3	3	2	2
C	269	C6-5 Do you adjust magnetic amplifiers or components	13	5	18	3	11	3	5	4	2	5	3	4	3	2
C	270	C6-6 Do you trace block diagrams of circuits containing saturable reactors	32	17	22	8	36	11	5	3	3	6	2	12	7	6
C	271	C6-7 Do you trace schematic diagrams of saturable reactor circuits	30	16	22	7	35	11	4	3	2	4	3	12	7	6
C	272	C6-8 Do you troubleshoot to isolate a faulty saturable reactor	28	16	19	7	32	10	4	3	2	4	2	12	7	3
C	273	C6-9 Do you troubleshoot saturable reactors to circuit level components	25	14	16	7	25	9	4	2	1	1	2	8	5	3
C	274	C6-10 Do you adjust saturable reactor circuits or components	23	14	15	5	26	8	4	2	0	2	1	7	4	3

D Y Nbr	Task Title																				
		303	303	304	304	304	304	304	305	455	455	455	455	455	455	455	455	455	455	455	455
D 277	D1-3 Do you troubleshoot circuits to isolate a faulty power supply	51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C						
D 278	D1-4 Do you troubleshoot power supplies to circuit level components	90	82	85	82	91	83	77	83	52	56	60	77	53	61						
D 279	D1-5 Do you align or adjust power supplies	76	78	79	68	84	77	46	62	19	22	21	60	33	36						
D 285	D1-11 Do you perform tasks on DC to DC converters	90	82	83	79	88	80	67	80	22	20	25	68	39	52						
D 286	D1-12 Do you perform tasks on inverters (DC to AC converters)	52	44	43	51	63	62	29	40	19	17	20	42	27	29						
D 287	D1-13 Do you perform tasks on switching power supplies	49	51	49	43	37	46	28	35	25	28	26	46	22	24						
D 290	D2-3 Do you troubleshoot circuits to isolate a faulty power supply filter	25	13	16	19	19	42	14	15	4	4	3	10	7	6						
D 291	D2-4 Do you troubleshoot power supply filters to circuit level components	65	70	55	42	60	66	24	46	14	9	17	50	26	25						
D 297	D2-10 Do you perform tasks on resistive capacitive (RC) power supply filters	59	63	48	40	53	62	18	37	7	5	8	42	24	22						
D 299	D3-1 Do you trace block diagrams of circuits containing power supply voltage regulators	58	61	50	28	53	58	20	30	14	10	13	49	24	25						
D 301	D3-3 Do you troubleshoot circuits to isolate a faulty power supply voltage regulator	86	80	78	71	82	79	54	62	26	27	33	62	39	47						
D 302	D3-4 Do you troubleshoot power supply voltage regulators to circuit level components	81	77	77	64	78	75	46	60	21	15	19	60	31	26						
D 303	D3-5 Do you perform tasks on variable resistor power supply voltage regulators	72	73	70	55	72	70	27	50	8	7	8	47	26	24						
D 306	D3-8 Do you perform tasks on IC power supply voltage regulators	77	71	63	50	67	67	35	45	14	16	18	51	30	31						
D 307	D3-9 Do you perform tasks on pulse width modulator power supply voltage regulators	45	27	35	30	33	43	17	26	5	5	5	21	16	16						
D 308	D3-10 Do you perform tasks on transistor series power supply voltage regulators with current limiting	48	26	27	11	19	14	10	13	2	3	5	18	15	15						
D 309	D3-11 Do you perform tasks on crow bar power supply voltage regulators	55	43	32	29	41	43	17	24	4	5	3	24	18	15						
E 315	E1-6 Do you calculate phase angle of RCL circuits	59	20	18	13	23	25	26	21	2	4	1	3	7	3						
E 316	E1-7 Do you calculate values of power in RCL circuits	14	14	15	8	15	13	7	6	3	4	2	8	4	5						
E 318	E2-2 Do you troubleshoot circuits to isolate a faulty frequency sensitive filter	17	17	16	10	18	16	8	7	3	3	4	8	4	9						
E 319	E2-3 Do you troubleshoot frequency sensitive filters to circuit level components	59	48	38	45	54	60	39	15	7	5	6	42	30	25						
E 320	E2-4 Do you align or adjust frequency sensitive filters	44	42	33	35	44	49	18	11	3	2	3	36	17	18						
E 321	E2-5 Do you calculate capacitance or inductance values for specific frequency sensitive filters	54	45	33	35	51	49	24	10	5	1	2	31	15	18						
E 326	E2-10 Do you perform tasks on ferrite bead frequency sensitive filters	19	19	18	13	17	23	8	5	2	1	1	8	5	5						
F 329	F1-3 Do you troubleshoot to isolate a faulty oscillator circuit	19	9	10	11	25	29	8	3	2	1	1	7	6	6						
F 330	F1-4 Do you troubleshoot oscillators to circuit level components	81	73	68	59	78	68	48	46	11	4	6	53	32	30						
F 331	F1-5 Do you align or adjust oscillator circuits	64	65	61	47	71	60	19	36	7	2	2	39	25	24						
F 337	F1-11 Do you perform tasks on shunt Hartley oscillator circuits	81	67	61	60	80	64	48	39	5	4	5	49	30	34						
F 338	F1-12 Do you perform tasks on Colpitts oscillator circuits	46	33	16	18	23	37	8	15	4	2	3	33	16	17						
		33	24	10	19	60	39	7	12	2	1	1	30	21	;						

D T Y	T Task Nbr	Task Title	303 51	303 52	303 53	303 54	304 51	304 54	304 56	304 58	305 X1A	305 X1B	305 X1C	305 X2A	305 X2B	305 X2C
F	339	F1-13 Do you perform tasks on Ciapp oscillator circuits	22	6	6	12	10	14	5	3	0	1	1	7	5	2
F	342	F1-16 Do you perform tasks on Wien bridge oscillator circuits	21	8	7	9	15	25	5	3	0	1	1	11	9	10
F	343	F1-17 Do you perform tasks on pulse generating oscillator circuits	41	29	30	18	29	21	15	17	1	4	4	30	18	11
F	344	F1-18 Do you perform tasks on blocked/blocking oscillator circuits	35	39	35	10	19	12	5	6	1	2	1	18	14	10
F	345	F1-19 Do you perform tasks on burst generators	12	4	6	7	39	9	6	3	0	1	1	9	8	8
F	347	F2-1 Do you trace block diagrams of circuits containing multivibrators	79	70	68	40	79	44	25	44	13	16	12	47	28	31
F	349	F2-3 Do you troubleshoot to isolate a faulty multivibrator circuit	71	66	63	33	71	41	18	40	9	7	6	43	22	20
F	350	F2-4 Do you troubleshoot multivibrators to circuit level components	60	59	58	28	60	35	11	33	7	4	2	31	18	13
F	351	F2-5 Do you adjust or align multivibrator circuits	68	51	57	29	65	33	13	28	6	1	4	34	18	18
F	352	F2-6 Do the multivibrators you work with use LC tank circuits	60	45	41	27	59	37	13	18	5	9	6	38	22	23
F	354	F2-8 Do the multivibrators you work with use Crystals	70	58	44	33	62	30	17	30	7	4	4	40	23	23
F	358	F2-12 Do you perform tasks on triggered astable multivibrators	60	42	44	24	43	30	9	27	5	5	3	29	16	20
F	359	F3-1 Do you trace block diagrams of circuits containing waveshaping circuits (WSC)	75	70	60	32	70	37	22	34	8	12	6	39	28	36
F	360	F3-2 Do you trace schematic diagrams of WSC	73	69	60	28	70	35	17	31	7	9	5	36	24	29
F	361	F3-3 Do you troubleshoot to isolate a faulty WSC	69	67	56	25	64	33	16	29	6	7	7	34	19	22
F	362	F3-4 Do you troubleshoot WSC to circuit level components	55	63	51	23	55	28	9	24	3	5	3	26	17	15
F	363	F3-5 Do you adjust or calibrate WSC	66	58	49	21	59	28	15	27	3	4	3	30	18	20
F	365	F3-7 Do you perform tasks on trapezoidal (ramp) wave generator WSC	62	40	41	10	28	16	9	11	0	1	2	27	14	23
F	373	F4-1 Do you trace block diagrams of circuits containing limiters	76	63	53	37	58	53	24	34	7	17	6	40	25	32
F	375	F4-3 Do you trace block diagrams of circuits containing clappers	65	60	48	29	56	43	17	29	2	10	3	32	19	16
F	377	F4-5 Do you troubleshoot to isolate a faulty limiter circuit	65	58	47	33	51	48	17	27	3	8	3	31	18	16
F	378	F4-6 Do you troubleshoot limiters to circuit level components	56	57	42	28	45	41	12	24	2	5	1	24	18	14
F	379	F4-7 Do you troubleshoot to isolate a faulty clamper circuit	59	58	44	25	47	40	14	26	1	6	1	25	15	13
F	380	F4-8 Do you troubleshoot clampers to circuit level components	52	55	42	23	43	35	11	23	1	4	1	19	14	10
F	385	F4-13 Do you perform tasks on transistor limiter circuits	53	44	25	23	35	39	11	19	2	5	2	26	16	13
G	398	G1-10 Do you multiply binary numbers	31	28	19	13	19	14	13	23	9	12	6	13	9	2
G	399	G1-11 Do you divide binary numbers	28	27	18	13	16	14	12	22	9	12	6	13	9	2
G	406	G1-18 Do you use ICAO codes	33	4	5	2	4	1	2	3	0	1	1	3	1	0
G	407	G1-19 Do you use excess-3 (XS3) codes	9	7	5	4	3	2	4	6	4	4	2	3	3	0
G	408	G1-20 Do you use parity bit codes	54	17	15	18	9	16	12	31	7	7	5	10	7	5
G	409	G1-21 Do you use biquinary codes	6	4	5	4	2	1	5	4	0	2	2	2	3	1
G	410	G1-22 Do you use ASCII codes	26	6	19	6	8	15	28	56	2	4	3	4	7	1
G	411	G1-23 Do you use EBCDI codes	4	4	4	2	3	2	3	7	0	1	1	2	1	0
G	413	G1-25 Do you trace data flow through logic schematic diagrams	74	51	44	35	51	35	30	72	21	19	13	34	22	21
G	414	G1-26 Do you troubleshoot digital systems to major units	76	47	44	38	50	37	36	72	20	22	18	38	28	22

D T Y	Task Nbr	Task Title	303 303 303 304 304 304 304 304 305 455 455 455 455 455 455 455																							
			51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C										
G	415	G1-27 Do you troubleshoot digital systems subassemblies or circuit cards	74	45	44	36	46	33	30	71	16	15	11	32	20	16										
G	416	G1-28 Do you troubleshoot digital systems, subsystems or circuit cards to circuit level components or IC	55	43	37	27	33	25	15	56	9	9	5	19	9	8										
G	430	G1-42 Do you perform tasks related to open collector gates (wired "AND" or wired "OR")	45	23	27	14	19	11	9	38	9	7	5	9	5	3										
G	431	G1-43 Do you perform tasks related to buffers	63	37	39	26	52	27	19	53	12	11	7	22	18	8										
G	433	G1-45 Do you perform tasks related to complemented flip flops	49	28	27	15	32	13	10	35	8	5	5	13	7	8										
G	434	G1-46 Do you perform tasks related to complementing flip flops	48	28	28	14	32	13	10	34	7	5	5	13	7	8										
G	441	G1-53 Do you perform tasks on ECL/CHL (emitter coupled or current mode logic)	16	22	13	6	9	4	5	15	1	4	3	3	3	1										
G	442	G1-54 Do you perform tasks on HTL (high threshold logic)	12	6	7	5	5	3	4	7	2	3	2	1	1	0										
G	443	G1-55 Do you perform tasks on CHOS (complementary metal oxide semiconductor)	26	16	31	18	25	12	8	30	2	3	2	5	5	1										
G	444	G1-56 Do you perform tasks on positive MOS ICs	18	12	13	7	9	6	3	14	1	3	2	4	4	0										
G	445	G1-57 Do you perform tasks on negative MOS ICs	15	12	12	7	8	5	3	12	1	3	2	3	3	0										
G	446	G1-58 Do you perform tasks on vertical MOS ICs	10	6	8	3	6	3	2	6	1	2	2	2	1	0										
G	450	G2-4 Do you troubleshoot computers to a major unit	68	9	27	7	14	12	23	77	26	19	24	11	11	3										
G	453	G2-7 Do you use computer flow charts or diagrams	63	6	25	5	12	11	19	73	20	13	17	9	8	0										
G	454	G2-8 Do you perform tasks on analog computers	20	8	20	1	9	9	5	26	27	19	26	12	8	3										
G	459	G2-13 Do you use ADA computer language	3	3	2	0	2	1	2	1	1	1	1	1	0	0										
G	460	G2-14 Do you use ATLAS computer language	2	3	2	0	2	1	2	1	2	1	2	1	1	0										
G	461	G2-15 Do you use ELAN computer language	2	3	2	0	2	1	2	1	1	1	1	1	1	0										
G	462	G2-16 Do you use PASCAL computer language	4	3	2	0	2	1	3	3	2	1	1	2	0	0										
G	463	G2-17 Do you use RPG computer language	3	3	2	0	2	1	2	2	1	1	1	1	0	0										
G	465	G2-19 Do you use C computer language	3	3	2	0	2	1	2	2	1	1	1	2	1	0										
G	468	G2-22 Do you perform tasks on paper (tape, punch card) computer memories	41	5	6	1	5	6	6	35	10	5	5	4	2	0										
G	469	G2-23 Do you perform tasks on advanced technology (bubble, CCD, electron beam, laser, thin film) computer memories	4	4	3	0	2	2	2	6	5	2	2	2	1	0										
G	477	G2-31 Do you perform tasks on toggle or push button switch inputs	58	9	21	5	5	9	13	60	11	10	12	7	7	3										
G	478	G2-32 Do you perform tasks on incandescent displays (Nixie tubes, LEDs, LCDs)	40	12	15	7	8	13	15	49	6	7	12	8	8	0										
G	482	G2-36 Do you perform tasks on removable cartridge disc drives	6	5	8	0	3	5	5	30	2	1	3	2	1	0										
G	484	G2-38 Do you perform tasks on fixed Winchester type disc drives	4	6	3	1	4	8	7	24	1	1	2	2	0	0										
G	489	G3-2 Do you troubleshoot counter circuits to isolate a faulty counter	55	44	34	24	48	25	14	45	8	6	5	21	11	13										
G	499	G3-12 Do you troubleshoot circuits containing registers to isolate a faulty register	51	40	24	20	19	17	9	47	5	5	5	10	4	2										
G	500	G3-13 Do you troubleshoot registers to circuit level components	37	33	19	15	17	12	8	40	3	4	3	7	2	0										
G	503	G3-16 Do you trace data flow through combinational logic circuits	56	37	20	21	25	15	21	45	7	9	5	13	9	9										
G	504	G3-17 Do you troubleshoot to isolate a faulty combinational logic circuit	51	36	19	20	23	14	20	42	6	6	3	12	7	.										

D Task Y Nbr	Task Title																								
		303	303	303	304	304	304	304	305	455	455	455	455	455	455	455	455	455	455	455	455	455	455	455	455
G 505	G3-18 Do you troubleshoot combinational logic circuits to circuit level components	51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C										
G 507	G3-20 Do you perform tasks on decoders	35	32	16	15	19	11	11	35	3	2	2	7	6	6										
G 508	G3-21 Do you perform tasks on multiplexers	58	43	28	27	30	16	36	43	4	8	6	20	11	14										
G 509	G3-22 Do you perform tasks on demultiplexers	64	32	22	26	26	13	36	40	7	9	5	9	7	2										
G 512	G3-25 Do you perform tasks on code converters	64	17	15	25	12	10	35	26	0	7	3	2	5	1										
G 514	G3-27 Do you perform tasks on subtractors	40	22	10	13	9	7	9	24	2	6	3	7	5	3										
G 517	G4-2 Do you trace data flow through D/A converters	49	33	16	9	17	9	7	26	3	7	3	6	3	2										
G 518	G4-3 Do you troubleshoot A/D converter circuits	73	45	34	18	32	24	33	37	8	14	11	25	18	21										
G 519	G4-4 Do you troubleshoot D/A converter circuits	72	41	30	17	34	21	31	30	8	10	9	15	10	8										
G 520	G4-5 Do the converters you perform tasks on use flash conversion	71	40	28	16	30	22	29	33	8	9	9	21	12	16										
G 521	G4-6 Do the converters you perform tasks on use successive approximation conversion	5	4	3	2	2	1	5	3	1	0	1	1	1	0										
G 523	G4-8 Do the converters you perform tasks on use R2R conversion	16	12	9	4	6	5	8	6	2	4	1	3	4	3										
H 527	H1-4 Do you construct transmission lines	12	5	3	2	4	1	4	2	0	1	1	2	1	0										
H 530	H1-7 Do you troubleshoot transmission lines	27	33	19	23	49	46	17	6	2	1	2	48	35	48										
H 536	H1-13 Do you perform tasks on fiber-optic transmission lines	60	37	31	30	69	59	28	16	2	3	4	58	54	61										
H 537	H1-14 Do you trace schematic or block diagrams of circuits containing waveguides	5	7	2	6	5	14	8	8	0	1	1	2	1	1										
H 538	H1-15 Do you troubleshoot circuits to isolate a faulty waveguide assembly	88	67	74	48	8	5	59	2	8	5	5	41	35	33										
H 539	H1-16 Do you pressurize or purge waveguide assemblies	83	63	70	45	6	5	56	1	7	4	4	44	30	30										
H 540	H1-17 Do you measure standing wave ratio for waveguide assemblies	67	68	64	27	4	3	47	1	2	2	3	37	30	24										
H 541	H1-18 Do you remove or install waveguide or associated coupling hardware components	83	68	47	27	5	3	34	1	1	1	2	30	25	16										
H 542	H2-1 Do you trace schematic or block diagrams of circuits containing microwave oscillators or amplifiers	86	69	73	43	5	5	56	1	4	4	4	44	34	30										
H 543	H2-2 Do you troubleshoot circuits to isolate a faulty microwave oscillator or amplifier	65	50	58	55	14	2	42	1	2	2	4	32	20	22										
H 549	H2-8 Do you perform tasks on magnetron microwave oscillators and amplifiers	62	47	55	53	13	2	41	1	2	1	4	31	16	16										
H 550	H2-9 Do you perform tasks on backward wave oscillator	76	30	65	4	4	0	5	0	1	1	4	33	21	16										
H 551	H2-10 Do you perform tasks on parametric amplifiers	3	9	13	4	0	0	3	0	0	0	0	0	0	2										
H 552	H2-11 Do you perform tasks on yttrium iron garnet (YIG) tuned microwave oscillators and amplifiers	58	9	12	12	0	0	42	0	0	0	1	0	1	1										
H 554	H3-2 Do you troubleshoot circuits to isolate a faulty resonant cavity	2	27	19	3	2	1	7	0	0	0	0	1	0	2										
H 563	H4-3 Do you trace block diagrams of AM transmitter subassemblies or circuit cards	53	51	44	23	46	28	17	1	1	0	1	32	22	20										
H 564	H4-4 Do you trace schematic diagrams of AM transmitter subassemblies or circuit cards	33	13	16	9	65	65	13	2	1	1	0	40	31	40										
H 565	H4-5 Do you troubleshoot AM transmitters to major units	32	13	16	9	67	63	11	2	1	1	0	36	29	29										
H 566	H4-6 Do you troubleshoot AM transmitters to subassemblies or circuit cards	27	12	16	8	65	65	12	2	1	1	1	45	44	51										
H 567	H4-7 Do you troubleshoot AM transmitter subassemblies or circuit cards to circuit level components	30	12	13	8	65	64	12	2	1	0	0	37	28	31										
H 568	H4-8 Do you align or adjust AM transmitters or circuits	19	12	13	6	58	59	7	2	1	0	0	28	17	15										
		35	12	14	9	65	64	10	2	1	0	0	38	27	34										



D T Y	Task Nbr	Task Title	303 51	303 52	303 53	304 50	304 51	304 54	304 56	305 54	455 X1A	455 X1B	455 X1C	455 X2A	455 X2B	455 X2C
H 616	H4-56	Do you troubleshoot PM transmitters to major units	59	46	46	5	37	1	15	2	1	1	2	33	22	23
H 617	H4-57	Do you troubleshoot PM transmitters to sub-assemblies or circuit cards	59	45	45	4	36	2	13	2	1	1	1	27	17	15
H 618	H4-58	Do you troubleshoot PM transmitter subassemblies or circuit cards to circuit level components	51	45	43	3	32	1	8	2	1	1	1	23	13	13
H 619	H4-59	Do you align or adjust PM transmitters or circuits	60	49	42	3	34	1	13	2	2	1	1	29	16	15
H 622	H4-62	Do you use "PM" demodulation principles	50	35	40	4	25	4	14	2	0	1	2	23	15	22
H 624	H4-64	Do you trace block diagrams of PM receiver subassemblies or circuit cards	53	40	40	5	27	4	13	2	0	1	3	24	12	21
H 626	H4-66	Do you troubleshoot PM receivers to major units	51	40	39	5	28	3	13	2	0	1	3	29	15	21
H 627	H4-67	Do you troubleshoot PM receivers to subassemblies or circuit cards	52	39	38	4	27	3	13	2	0	1	2	25	11	13
H 628	H4-68	Do you troubleshoot PM receiver subassemblies or circuit cards to circuit level components	44	40	36	2	25	3	8	1	0	1	1	19	10	9
H 629	H4-69	Do you align or adjust PM receivers or circuits	53	41	38	3	27	3	11	2	0	1	2	26	10	15
H 630	H5-1	Do you physically align antennas	79	61	68	33	68	45	52	2	6	2	8	50	27	34
H 631	H5-2	Do you electrically align antennas	58	51	61	16	62	32	42	1	4	2	4	42	23	26
H 632	H5-3	Do you troubleshoot loading of antennas	37	27	25	13	50	43	17	0	1	1	3	41	33	40
H 633	H5-4	Do you troubleshoot coupling of antennas	54	38	37	16	56	46	24	1	3	2	5	52	35	48
H 634	H5-5	Do you plot graph radiation patterns	15	15	10	8	78	12	7	0	0	0	1	5	2	3
H 635	H5-6	Do you troubleshoot antenna components	71	53	46	20	53	35	48	1	5	4	6	59	53	34
H 636	H5-7	Do you measure standing wave ratio (SWR) for antennas	74	57	36	20	80	59	31	0	0	1	4	56	59	54
H 637	H5-8	Do you work with Yagi antennas	3	4	5	4	49	7	4	0	0	0	1	2	1	2
H 638	H5-9	Do you work with dipole antennas	69	30	35	13	77	55	24	1	1	1	3	39	26	52
H 639	H5-10	Do you work with slotted antennas	7	9	9	3	40	4	3	0	1	1	1	10	7	3
H 640	H5-11	Do you work with rotary antennas	53	43	11	3	45	9	4	0	3	1	2	33	27	21
H 641	H5-12	Do you work with hertz antennas	2	4	4	2	7	14	3	0	0	1	1	3	2	1
H 642	H5-13	Do you work with marconi antennas	2	4	4	3	5	16	3	0	1	1	1	3	1	5
H 643	H5-14	Do you work with rhombic antennas	2	5	4	2	4	16	3	0	0	0	1	5	6	8
H 644	H5-15	Do you work with scimitar antennas	2	4	3	2	6	3	3	0	0	0	1	2	1	2
H 645	H5-16	Do you work with parabolic antennas	72	44	75	36	53	11	61	1	0	1	5	30	24	24
H 646	H5-17	Do you work with ground plane antennas	9	9	5	8	22	23	6	1	0	1	1	21	28	24
H 647	H5-18	Do you perform tasks on rotary antenna arrays	39	32	8	3	28	6	5	0	4	1	1	25	20	7
H 648	H5-19	Do you perform tasks on stacked (end fire) antenna arrays	3	18	4	2	6	6	3	0	0	0	1	2	2	0
H 649	H5-20	Do you perform tasks on broadside antenna arrays	4	4	2	2	5	8	3	0	0	0	1	2	1	1
H 650	H5-21	Do you perform tasks on cardioid antenna arrays	2	6	2	2	32	4	3	0	0	1	1	17	17	24
H 651	H5-22	Do you perform tasks on collinear antenna arrays	3	5	3	2	27	6	3	0	0	0	1	2	2	5
H 652	H5-23	Do you perform tasks on phase antenna arrays	59	20	8	5	26	5	8	1	0	1	2	10	7	11
H 653	H5-24	Do you perform tasks on planar antenna arrays	28	16	3	3	6	4	4	0	0	1	1	4	3	7
H 657	H5-28	Do you perform tasks on antennas with unidirectional radiation patterns	60	53	51	27	75	37	32	1	3	1	3	47	39	47
H 658	H5-29	Do you perform tasks on antennas with bidirectional radiation patterns	40	29	16	14	20	36	26	1	3	3	4	41	29	47
H 659	H5-30	Do you perform tasks on antennas with omnidirectional radiation patterns	66	53	24	16	83	55	18	1	2	1	3	67	64	70
I 660	I1-1	Do you measure RF power	91	73	85	67	89	73	82	2	6	2	6	79	68	86
I 661	I1-2	Do you measure RF peak power	84	70	77	31	88	46	43	2	4	1	3	59	44	59
I 662	I1-3	Do you measure RF average power	88	72	81	33	85	39	39	1	2	1	3	50	38	48
I 663	I1-4	Do you measure RF effective power	49	43	57	24	37	36	36	1	1	0	3	34	30	29



D	T	I	J	Y	Nbr	Task Title	303	303	303	304	304	304	304	305	455	455	455	455	455	455
							51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C
I	664					I1-5 Do you measure RF output power using wattmeters	62	56	50	47	87	74	74	1	4	1	6	73	68	89
I	665					I2-1 Do you calculate RF apparent power	29	20	25	11	25	17	17	1	0	0	3	11	11	10
I	666					I2-2 Do you calculate RF true power	30	24	26	18	36	20	18	1	0	0	3	20	18	15
I	667					I2-3 Do you calculate RF power loss or gain in db	79	58	69	44	75	42	59	2	4	1	4	47	38	38
J	668					J1-1 Do you trace block diagrams of circuits containing microphones	15	4	22	23	18	73	8	6	1	1	3	31	36	55
J	669					J1-2 Do you trace schematic diagrams of microphone circuits	13	4	20	19	18	70	6	6	1	1	2	28	26	48
J	670					J1-3 Do you troubleshoot to isolate a faulty microphone	14	4	21	22	18	74	9	6	1	1	3	37	39	48
J	671					J1-4 Do you troubleshoot microphones	10	4	17	17	14	66	6	4	0	0	2	21	18	32
J	672					J1-5 Do you work on capacitor microphones	8	2	13	16	9	69	8	4	1	0	2	24	30	45
J	673					J1-6 Do you work on capacitor microphones	1	2	2	2	2	16	2	1	0	0	1	2	2	7
J	674					J1-7 Do you work on crystal microphones	3	2	5	4	5	14	4	1	0	0	0	5	3	5
J	675					J1-8 Do you work on dynamic microphones	7	3	17	10	11	70	3	3	1	0	2	28	33	48
J	676					J1-9 Do you work on velocity ribbon microphones	1	2	2	0	1	5	1	0	0	0	0	2	1	2
J	677					J1-10 Do you trace block diagrams of circuits containing speakers	17	6	23	36	18	76	12	11	10	1	4	42	39	43
J	678					J1-11 Do you trace schematic diagrams of speaker circuits	17	6	22	33	18	73	10	10	9	1	4	34	30	38
J	679					J1-12 Do you troubleshoot to isolate a faulty speaker	16	6	22	34	18	75	13	12	10	1	4	44	41	40
J	680					J1-13 Do you troubleshoot speakers	11	6	16	23	12	57	9	5	3	1	2	15	17	21
J	681					J2-1 Do you trace block diagrams of circuits containing photosensitive devices	47	19	24	9	5	23	12	34	4	1	1	8	5	3
J	683					J2-3 Do you troubleshoot to isolate a faulty photo-sensitive device	44	19	21	8	5	21	12	34	5	2	0	7	3	2
J	684					J2-4 Do you adjust or calibrate photosensitive devices	36	14	13	7	4	16	7	27	3	0	0	4	1	0
J	686					J2-6 Do you work on phototransistors	10	6	12	2	1	10	3	17	2	1	1	3	1	0
J	687					J2-7 Do you work on phototubes	39	14	6	5	0	2	2	1	0	0	1	1	0	0
J	688					J2-8 Do you work on photo-SCRs	5	3	5	1	0	5	1	4	0	0	1	1	1	1
J	690					J3-1 Do you trace block diagrams of circuits containing display tubes	9	2	6	1	4	1	5	3	0	0	5	14	5	9
J	691					J3-2 Do you trace schematic diagrams of display tubes or circuits	9	2	5	1	4	1	3	3	0	0	4	14	4	7
J	692					J3-3 Do you troubleshoot to isolate a faulty display tube	9	2	6	1	4	1	3	3	0	0	3	14	4	9
J	693					J3-4 Do you adjust or calibrate display tubes or circuits	8	2	6	1	4	1	3	3	0	1	2	13	4	7
J	694					J3-5 Do you work on direct view storage tubes (DVST)	3	1	6	1	1	0	2	2	0	0	3	12	3	9
J	695					J3-6 Do you work on multiple mode storage tubes (NMST)	1	1	2	0	1	0	1	0	0	0	2	1	1	1
J	696					J3-7 Do you work on scan converter tubes (SCT)	1	1	2	0	1	0	1	1	0	0	0	1	3	1
J	697					J4-1 Do you trace block diagrams of TV systems or subassemblies	51	1	32	17	1	4	2	3	1	1	7	1	0	1
J	698					J4-2 Do you trace schematic diagrams of TV systems or component circuits	52	1	30	17	1	4	2	3	1	1	7	1	0	1
J	699					J4-3 Do you troubleshoot TV systems to major subassemblies	51	1	27	16	1	4	2	3	1	1	6	1	0	1
J	700					J4-4 Do you troubleshoot TV systems to circuit level components	49	1	22	15	1	3	2	2	0	0	3	0	0	1
J	701					J4-5 Do you adjust or calibrate TV systems or components	50	1	26	16	1	4	2	3	0	1	3	0	0	1
J	702					J4-6 Do you trace block diagrams of laser systems or subassemblies	1	1	3	1	0	2	1	3	0	2	1	0	1	0

D T Y	Task Nbr	Task Title	303	303	303	304	304	304	304	305	455	455	455	455	455	455	455	455	455
			51	52	53	50	51	54	56	54	X1A	X1B	X1C	X2A	X2B	X2C			
J	703	J4-7 Do you trace schematic diagrams of laser systems or component circuits	1	1	3	1	0	2	1	2	0	1	1	1	0	0	0		
J	704	J4-8 Do you troubleshoot laser systems to major subassemblies	0	1	3	0	0	2	1	3	0	1	1	0	1	0			
J	705	J4-9 Do you troubleshoot laser systems to circuit level components	1	1	1	0	0	1	1	1	0	1	1	0	1	0	0		
J	706	J4-10 Do you adjust or calibrate laser systems or components	1	1	1	1	0	2	1	2	0	1	1	0	1	0	0	0	
J	707	J4-11 Do you trace block diagrams of infrared systems or subassemblies	0	1	2	0	1	1	1	1	0	1	2	0	0	0	0		
J	708	J4-12 Do you trace schematic diagrams of infrared systems or component circuits	1	1	1	0	1	1	1	1	0	1	1	0	1	0	0	0	
J	709	J4-13 Do you troubleshoot infrared systems to major subassemblies	0	1	2	0	1	1	1	0	0	1	1	0	0	0	0		
J	710	J4-14 Do you troubleshoot infrared systems circuit level components	1	1	1	0	1	1	1	0	0	0	1	0	0	0	0	0	
J	711	J4-15 Do you inspect, clean, or service infrared systems or components	1	1	1	0	1	1	1	0	0	1	1	0	0	0	0	0	
J	712	J4-16 Do you adjust or calibrate infrared systems or components	1	1	1	0	1	0	1	0	0	1	1	0	0	0	0	0	

## Report Option Table for Modules

Option	Status
Primary Sort	Inventory Sequence
Secondary Sort	Not Used
Print Suppress	Not Used

## Report Option Table for Tasks

Option	Status
Primary Sort	Inventory Sequence
Secondary Sort	Not Used
Print Suppress	Not Used

## Description of Reported Module Factors

Col	Factor	Source vector	Title	Number Members	Mean	S.D.	Based on All Tasks Within Range	Max	Min	Valid
1	TITLE		Module Statement							

## Description of Reported Task Factors

Col	Factor	Source vector	Title	Number Members	Mean	S.D.	Based on All Tasks Within Range	Max	Min	Valid
1	TITLE		Task Statement							
2	F0097	GP0136/PHP	All DAFSC 455X4	59	31.88	28.14	96.61	.00	.00	712
3	F0098	GP0138/PHP	All DAFSC 455X6	83	34.98	25.99	100.00	.00	.00	712
4	F0100	GP0140/PHP	All DAFSC 456X1A	113	24.68	18.84	98.23	.00	.00	712
5	F0101	GP0141/PHP	All DAFSC 456X1B	107	20.11	18.86	94.39	.00	.00	712

Electronic Principles Inventory (EPI) data for Air Force specialties is presented below in Keesler EP POI order. Data for this report was collected from job incumbents during the period March 1987 - September 1988

Percent members responding "YES" is shown for each specialty listed. Where skill level is not specified, both 5 and 7 skill levels are included (e.g., DAFSC 000X0 includes 00050 and 00070).

For assistance in using this EPI printout phone USAFOMC/DHYA, at AUTOVON 487-6623.

D	T Tsk	Task Title	455	456	456
Y	Mbr		X4	X6	X1A
					X1B

0001 POI E3AQR30020 009, ELECTRONIC PRINCIPLES, Dated 1 June 1987 KEESLER TECHNICAL TRAINING CENTER Volume 1 of 4 Volumes

0002 I. DC Circuits

0003 I 1. Orientation, Safety, and First Aid 1/2

0004 I 1a. Orientation (1)

A 1 A1-1 Do you use metric terms (example milli, kilo, mega) 81 76 73 72

0005 I 1b. Given four questions, each containing four options, select the option for each question that describes a major safety precaution to be observed when working on electrical equipment IAW SI-KEP-10, Chap 1. Four out of four questions must be answered correctly. CTS: 1a Meas: W (0/1)

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Y Nbr

Task Title

455 455 456 456  
X4 X6 X1A X1B

0006 I lc. Given four questions, each consisting of four options, select the option for each question which describes a first aid measure to be used for the treatment of electrical shock IAW ST-KEP-10, Chap 1. Four of the four questions must be answered correctly.  
CTS: 1b Meas: W (0/.5)

0007 I ld. Given two questions, each consisting of three options, select the option for each question that states the type of fire extinguisher to be used for electrical fires IAW ST-KEP-10, Chap 1. Two of the two questions must be answered correctly.  
CTS: 1a Meas: W (0/.5)

0008 I 2. Prefixes and Powers of Ten 7/0

0009 I 2a. Given three questions requiring addition of two two-digit numbers expressed with powers of ten, with three options for each question, select the option for each question which expresses the answer as a power of ten IAW ST-KEP-10, Chap 2. Two out of three questions must be answered correctly. CTS: 2a Meas: W (1)

0010 I 2b. Given three questions requiring subtraction of two two-digit numbers expressed with powers of ten, with three options for each question, select the option for each question which expresses the answer as a power of ten IAW ST-KEP-10, Chap 2. Two out of three questions must be answered correctly. CTS: 2a Meas: W (1)

A 1 A1-1 Do you use metric terms (example milli, kilo, mega) 81 76 73 72

D  
T Task  
Y Mbr

Task Title

455 455 456 456  
X4 X6 X1A X1B

0011 I 2c. Given three questions requiring multiplication of two two-digit numbers expressed with powers of ten, with three options for each question, select the option for each question which expresses the answer as a power of ten IAW ST-KEP-10, Chap 2. Two out of three questions must be answered correctly. CTS: 2a Meas: W (1)

A 1 A1-1 Do you use metric terms (example mill, kilo, mega) 81 76 73 72

0012 I 2d. Given three questions requiring division of two two-digit numbers expressed with powers of ten, with three options for each question, select the option for each question which expresses the answer as a power of ten IAW ST-KEP-10, Chap 2. Two out of three questions must be answered correctly. CTS: 2a Meas: W (1)

A 1 A1-1 Do you use metric terms (example mill, kilo, mega) 81 76 73 72

0013 I 2e. Given three questions, each with a two-digit number expressed as a power of ten requiring extraction of the square root and three options expressed as a power of ten, select the option for each question which represents the square root IAW ST-KEP-10, Chap 2. Two out of three questions must be answered correctly. CTS: 2a Meas: W (1)

A 1 A1-1 Do you use metric terms (example mill, kilo, mega) 81 76 73 72

0014 I 2f. Given three questions, each containing an electrical prefix and three options expressed in powers of ten, select the option for each question that represents the given prefix expressed as a power of ten IAW ST-KEP-10, Chap 2. Two out of three questions must be answered correctly. CTS: 2a Meas: W (1)

A 1 A1-1 Do you use metric terms (example mill, kilo, mega) 81 76 73 72

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T Isk  
Y Nbr

Task Title

455 455 456 456  
X4 X6 X1A X1B

0015

I 29. Given three questions, each containing a number expressed with an electrical prefix and three options expressed with electrical prefixes, select the option for each question which indicates the given number converted to another electrical prefix IAW ST-KEP-10, Chap 2. Two of the three questions must be answered correctly. CTS: 2a Meas: W

(1)

A 1

Al-1 Do you use metric terms (example milli, kilo, mega)

81 76 73 72

0016

I 3. Direct Current and Voltage

3/0

0017

I 3a. Given three questions, each with four options, select the option for each question which states the relative quantity of free electrons within a conductor, IAW ST-KEP-10, Chap 3. Two out of three questions must be answered correctly. CTS: 3a Meas: W

(.5)

A 2

Al-2 Do you use basic DC electrical/electronic terms

97 96 95 93

0018

I 3b. Given three questions, each with four options, select the option for each question which states the relative quantity of free electrons within an insulator, IAW ST-KEP-10, Chap 3. Two out of three questions must be answered correctly. CTS: 3a Meas: W

(.5)

A 2

Al-2 Do you use basic DC electrical/electronic terms

97 96 95 93

0019

I 3c. Given three questions, each with three options, select the option for each question that describes the movement of free electrons within a conductor IAW ST-KEP-10, Chap 3. Two out of three questions must be answered correctly. CTS: 3a Meas: W

(.5)

A 2

Al-2 Do you use basic DC electrical/electronic terms

97 96 95 93

D	T Task	Y Nbr	Task Title	455	456	456	456
				X4	X6	X1A	X1B

0020 I 3d. Given three questions, each with three options, select the option for each question that illustrates the symbol for electron flow and the name and symbol for its unit of measurement IAW ST-KEP-10, Chap 3. Two of the three questions must be answered correctly. CTS: 3a Meas: W (.5)

A	2	Al-2 Do you use basic DC electrical/electronic terms	97	96	95	93
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0021 I 3e. Given three questions, each containing three options, select the option for each question that illustrates the symbol for voltage and the name and symbol for its unit of measurement IAW ST-KEP-10, Chap 3. Two of the three questions must be answered correctly. CTS: 3a Meas: W (.5)

A	2	Al-2 Do you use basic DC electrical/electronic terms	97	96	95	93
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0022 I 3f. Given three questions, each containing three options, select the option for each question that illustrates the three requirements for current flow IAW ST-KEP-10, Chap 3. Two of the three questions must be answered correctly. CTS: 3b Meas: W (.5)

A	2	Al-2 Do you use basic DC electrical/electronic terms	97	96	95	93
A	4	Al-4 Do you trace schematic or block diagrams of circuits containing conductors, fuses, lamps, switches, or batteries	97	96	89	94

0023 I 4. Resistance, Resistors and Schematic Symbols 1.5/2

0024 I 4a. Given three questions, each with four options pertaining to resistance, select the option for each question that describes resistance, IAW ST-KEP-10, Chap 4. Two of three questions must be answered correctly. CTS: 3a Meas: W (.5)

A	2	Al-2 Do you use basic DC electrical/electronic terms	97	96	95	93
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D T Y	Task Title	455 X4	455 X6	456 X1A	456 X1B

0025 I 4b. Given three questions, each containing three options, select the option for each question that illustrates the symbol for resistance and the name and symbol for its unit of measurement IAW ST-KEP-10, Chap 4. Two of the three questions must be answered correctly. CTS: 3a Meas: W (.5)

A 2	Al-2 Do you use basic DC electrical/electronic terms	97	96	95	93
A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79

0026 I 4c. Given resistor pictorials of carbon, fixed, slide tap, fixed tap and a potentiometer, and a list of their names, match each pictorial to its name IAW ST-KEP-10, Chap 4. Three of the five must be matched correctly. CTS: 4b Meas: W (0/.5)

A 2	Al-2 Do you use basic DC electrical/electronic terms	97	96	95	93
A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
A 11	Al-11 Do you calibrate or adjust circuits by using variable resistors	85	92	73	71

0027 I 4d. Given schematic symbols of fixed and tapped resistors, a potentiometer and a list of their names, match each symbol with its name IAW ST-KEP-10, Chap 4. Two of the three schematic symbols must be matched correctly. CTS: 4b Meas: W (0/.5)

A 2	Al-2 Do you use basic DC electrical/electronic terms	97	96	95	93
A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
A 11	Al-11 Do you calibrate or adjust circuits by using variable resistors	85	92	73	71

D	T Tsk	Y Nbr	Task Title	455	456	456	456
				X4	X6	X1A	X1B

0028 I 4e. Given schematic symbols of a battery, fuse, lamp and switch, and a list of their names, match each symbol with its name IAW ST-KEP-10, Chap 4. Three of the four matches must be correct.

CTS: 4b Meas: W (0/.5)

A	2	A1-2 Do you use basic DC electrical/electronic terms	97	96	95	93
A	4	A1-4 Do you trace schematic or block diagrams of circuits containing conductors, fuses, lamps, switches, or batteries	97	96	89	94

0029 I 4f. Given schematic symbols of an ammeter, ohmmeter and voltmeter, and a list of their names, match each symbol with its name IAW ST-KEP-10, Chap 4. Three of the four matches must be correct.

CTS: 4b Meas: W (0/.5)

A	2	A1-2 Do you use basic DC electrical/electronic terms	97	96	95	93
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0030 I 4g. Given three questions, each with a carbon resistor pictorial having four color coded bands, four options, and a resistor color code chart, select the option for each question stating the resistance value IAW ST-KEP-10, Chap 4. Two out of three questions must be answered correctly.

CTS: 4c Meas: W (.5)

A	2	A1-2 Do you use basic DC electrical/electronic terms	97	96	95	93
A	13	A1-13 Do you determine ohmic value of a resistor using the color code	27	70	48	49

CTS: 4c Meas: W (4/0)

0031 I 5. Multimeter Uses

D	T	Task Title	455	455	456	456
Y	Nbr		X4	X6	X1A	X1B

0032 I 5a. Given the names of multimeter controls; FUNCTION, RANGE, OHMS ZERO, and three statements pertaining to their purpose, match the name of each control to its purpose IAW ST-KEP-10, Chap 5. Two of the three matches must be correct. CTS: 5a, 5b, 5c Meas: W (.25)

A	14	Al-14 Do you ohm check resistors	69	82	63	66
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0033 I 5b. Given three multimeter pictorials each with the FUNCTION switch set to OHMS position and a specific RANGE control setting and four options, select the option for each question that states the resistance value IAW ST-KEP-10, Chap 5. Two out of three questions must be answered correctly. CTS: 5c Meas: W (.25)

A	14	Al-14 Do you ohm check resistors	69	82	63	66
B	159	B1-7 Do you use the multimeter to measure circuit resistance	85	86	69	75
B	160	B1-8 Do you use the multimeter to measure component resistance	86	90	65	69

0034 I 5c. Given three multimeter pictorials each with the FUNCTION switch set to the DC VOLTAGE position and a specific RANGE control setting and four options, select the option for each question that states the DC voltage value IAW ST-KEP-10, Chap 5. Two out of three questions must be answered correctly. CTS: 5a Meas: W (.25)

B	153	B1-1 Do you use the multimeter to measure DC voltage values	95	100	98	93
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0035 I 5d. Given three multimeter pictorials each with the FUNCTION switch set to the DC CURRENT position and a specific RANGE control setting and four options, select the option for each QUESTION that states the DC current value IAW ST-KEP-10, Chap 5. Two out of three questions must be answered correctly. CTS: 5b Meas: W (.25)

B	156	B1-4 Do you use the multimeter to measure DC current values	73	72	54	63
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D	Tsk	Y Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B

0036 I 5e. Given three multimeter pictorials each with the FUNCTION switch set to the AC position and a specific RANGE control setting and four options, select the option for each question that states the AC voltage value IAW ST-KEP-10, Chap 5. Two out of three questions must be answered correctly. CTS: 5a Meas: W (.25)

B 154	B1-2 Do you use the multimeter to measure AC voltage values	97	98	93	87
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0037 I 5f. Given a multimeter and DC trainer to include three different resistors, measure the ohmic value of each resistor with + or - 10 percent accuracy, IAW ST-KEP-10, Chap 5. CTS: 4a Meas: PC, W (1)

A 14	A1-14 Do you ohm check resistors	69	82	63	66
B 159	B1-7 Do you use the multimeter to measure circuit resistance	85	86	69	75
B 160	B1-8 Do you use the multimeter to measure component resistance	86	90	65	69

0038 I 5g. Given a DC power supply, multimeter, and trainer with a three resistor series circuit, measure the DC voltage across each resistor with + or - 10 percent accuracy IAW ST-KEP-10, Chap 5. CTS: 5a Meas: PC, W (1)

B 153	B1-1 Do you use the multimeter to measure DC voltage values	95	100	98	93
B 188	B4-4 Do you use digital multimeters	97	96	93	79

0039 I 5h. Given an AC source and multimeter connected to an AC voltage, measure the AC voltage with + or - 10 percent accuracy IAW ST-KEP-10, Chap 5. CTS: 5a Meas: PC, W (.75)

B 154	B1-2 Do you use the multimeter to measure AC voltage values	97	98	93	87
B 175	B3-4 Do you use audio sine-wave signal generators	8	83	29	14

D  
T Task  
Y Mbr

Task Title

455 456 456 456  
X4 X6 X1A X1B

0040 I 6. Resistive Circuits

10/4

0041 I 6a. Given three questions each containing three schematic diagrams, select the diagram in each question which satisfies the requirements for a DC circuit IAW ST-KEP-10, Chap 6. Two of the three diagrams selected must be correct. CTS: 3b Meas: W (1.5)

A 4 A1-4 Do you trace schematic or block diagrams of circuits containing conductors, fuses, lamps, switches, or batteries

94

0042 I 6b. Given three questions each with four options, select the option for each question which describes the relationship between resistance, current and voltage as stated by OHM's LAW IAW ST-KEP-10, Chap 6. Two out of three questions must be answered correctly. CTS: 2b Meas: W (0/1.5)

A 9 A1-9 Do you trace schematic or block diagrams of circuits containing resistors

79

A 12 A1-12 Do you calculate the value of a resistor required for a circuit

26

0043 I 6c. Given three questions each consisting of a series circuit schematic diagram with three resistors, individual resistance values, applicable formulas and four options, select the option for each question that states the total circuit resistance IAW ST-KEP-10, Chap 6. Two of the three questions must be answered correctly. CTS: 4d Meas: W (0/.5)

A 6 A1-6 Do you calculate values of DC voltage, current, resistance, or power

47

A 9 A1-9 Do you trace schematic or block diagrams of circuits containing resistors

79

D T Y	Task Title	455 X4	455 X6	456 X1A	456 X1B

0044 I 6d. Given three questions each consisting of a series circuit schematic diagram with three resistors, applied voltage, total resistance, applicable formulas and four options, select the option for each question that states the total current IAW ST-KEP-10, Chap 6. Two out of the three questions must be answered correctly. CTS: 4d Meas: W (0.5)

A 6	Al-6 Do you calculate values of DC voltage, current, resistance, or power	69	48	43	47
A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79

0045 I 6e. Given three questions each consisting of a series circuit schematic diagram with three resistors, individual resistance values, total current, applicable formulas and four options, select the option for each question that states the voltage developed across a selected resistor IAW ST-KEP-10, Chap 6. Two of the three questions must be answered correctly. CTS: 4d Meas: W (0.5)

A 6	Al-6 Do you calculate values of DC voltage, current, resistance, or power	69	48	43	47
A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79

0046 I 6f. Given three questions each consisting of a series circuit schematic diagram with three resistors, applied voltage, total current, applicable formulas and four options, select the option for each question that states the total circuit power dissipated IAW ST-KEP-10, Chap 6. Two out of three questions must be answered correctly. CTS: 4d Meas: W (0.5)

A 6	Al-6 Do you calculate values of DC voltage, current, resistance, or power	69	48	43	47
A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79

D  
T Tsk  
Y Nbr

455 455 456 456  
X4 X6 X1A X1B

Task Title

0047 I 6g. Given three questions each consisting of a parallel circuit schematic diagram with three resistors, individual resistance values, applicable formulas and four options, select the option for each question that states the total resistance IAW ST-KEP-10, Chap 6. Two of the three questions must be answered correctly. CTS: 4d Meas: W (0.5)

A	6	Al-6 Do you calculate values of DC voltage, current, resistance, or power	69	48	43	47
A	9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79

0048 I 6h. Given three questions each consisting of a parallel circuit schematic diagram with three resistors, total resistance, applied voltage, applicable formulas and four options, select the option for each question that states the total current IAW ST-KEP-10, Chap 6. Two of the three questions must be answered correctly. CTS: 4d Meas: W (0.5)

A	6	Al-6 Do you calculate values of DC voltage, current, resistance, or power	69	48	43	47
A	9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79

0049 I 6i. Given three questions each consisting of a parallel circuit schematic diagram with three resistors, total resistance, applied voltage, applicable formulas and four options, select the option for each question that states the total circuit power dissipated IAW ST-KEP-10, Chap 6. Two of the three questions must be answered correctly. CTS: 4d Meas: W (0.5)

A	6	Al-6 Do you calculate values of DC voltage, current, resistance, or power	69	48	43	47
A	9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79

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	Task Title							

0050	I 6j. Given three questions each consisting of a parallel circuit schematic diagram with three resistors, individual resistance values, applied voltage, applicable formulas and four options, select the option for each question that states the current flow in a selected branch IAW ST-KEP-10, Chap 6. Two of the three questions must be answered correctly. CTS: 4d Meas: W (0.5)	455 X4	455 X6	456 X1A	456 X1B
A 6	A1-6 Do you calculate values of DC voltage, current, resistance, or power	69	48	43	47
A 9	A1-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
0051	I 6k. Given three questions each consisting of a series-parallel circuit schematic diagram with three resistors, individual resistance values, applicable formulas and four options, select the option for each question that states the total resistance IAW ST-KEP-10, Chap 6. Two out of the three questions must be answered correctly. CTS: 4d Meas: W (0.5)				
A 6	A1-6 Do you calculate values of DC voltage, current, resistance, or power	69	48	43	47
A 9	A1-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
0052	I 6l. Given three questions each consisting of a series-parallel circuit schematic diagram with three resistors, individual resistance values, applied voltage, applicable formulas and four options, select the option for each question that states the total current IAW ST-KEP-10, Chap 6. Two out of the three questions must be answered correctly. CTS: 4d Meas: W (0.5)				
A 6	A1-6 Do you calculate values of DC voltage, current, resistance, or power	69	48	43	47
A 9	A1-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79



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Task Title

455 456 456  
X4 X6 X1A X1B

0053 I 6n. Given three questions each consisting of a series-parallel circuit schematic diagram with three resistors, individual resistance values, applied voltage, total current, individual branch currents, applicable formulas and four options, select the option for each question that states the voltage developed across a selected resistor IAW ST-KEP-10, Chap 6. Two out of the three questions must be answered correctly.  
CTS: 4d Meas: W (0/.5)

A 6 A1-6 Do you calculate values of DC voltage, current, resistance, or power 69 48 43 47  
A 9 A1-9 Do you trace schematic or block diagrams of circuits containing resistors 92 92 73 79

0054 I 6n. Given three questions each consisting of a series-parallel circuit schematic diagram with three resistors, individual resistance values, applied voltage, total current, applicable formulas and four options, select the option for each question that states the total circuit power dissipated IAW ST-KEP-10, Chap 6. Two out of the three questions must be answered correctly. CTS: 4d Meas: W (0/.5)

A 6 A1-6 Do you calculate values of DC voltage, current, resistance, or power 69 48 43 47  
A 9 A1-9 Do you trace schematic or block diagrams of circuits containing resistors 92 92 73 79

0055 I 6o. Given three questions, each consisting of three resistive bridge circuit diagrams with individual resistance values, applied voltage, and applicable formulas, select the option for each question that indicates a balanced bridge IAW ST-KEP-10, Chap 6. Two out of three questions must be answered correctly.  
CTS: 4d Meas: W (0/.5)

A 6 A1-6 Do you calculate values of DC voltage, current, resistance, or power 69 48 43 47  
A 9 A1-9 Do you trace schematic or block diagrams of circuits containing resistors 92 92 73 79  
A 12 A1-12 Do you calculate the value of a resistor required for a circuit 15 41 23 26

D	T	Task Title	455	456	456	456
Y	Nbr		X4	X6	X1A	X1B

0056 I 6p. Given three questions, each consisting of a resistive bridge circuit schematic diagram, individual resistance values for three of the four resistors, applied voltage, applicable formulas and four options, select the option for each question that states the unknown value of resistance required to balance the resistive bridge circuit IAW ST-KEP-10, Chap 6. Two of the three questions must be answered correctly.  
CTS: 4d Meas: W (0/.5)

A	6	Al-6 Do you calculate values of DC voltage, current, resistance, or power	69	48	43	47
A	9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79

0057 I 6q. Given a multimeter, a trainer with a three-resistor series-parallel circuit, measure the total resistance within + or - 10 percent accuracy IAW ST-KEP-10, Chap 6. CTS: 5c Meas: PC, W (1)

A	9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
A	14	Al-14 Do you ohm check resistors	69	82	63	66
B	159	B1-7 Do you use the multimeter to measure circuit resistance	85	86	69	75
B	188	B4-4 Do you use digital multimeters	97	96	93	79

0058 I 6r. Given a multimeter, a trainer with a three-resistor series-parallel circuit, and a DC voltage power supply, measure the individual voltages within + or - 10 percent accuracy IAW ST-KEP-10, Chap 6. CTS: 5a Meas: PC, W (1.5)

A	9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
B	153	B1-1 Do you use the multimeter to measure DC voltage values	95	100	98	93
B	188	B4-4 Do you use digital multimeters	97	96	93	79

D  
T Tsk  
Y Nbr

Task Title

455 455 456 456  
X4 X6 X1A X1B

0059 I 6s. Given a multimeter, trainer with a loaded voltage divider having four taps and a movable ground and a DC voltage power supply, determine the voltage at each tap with respect to the ground reference point within + or - 10 percent accuracy IAW ST-KEP-10, Chap 6. CTS: 5a Meas: PC, W (1.5)

A 9 A1-9 Do you trace schematic or block diagrams of circuits containing resistors 92 92 73 79  
B 153 B1-1 Do you use the multimeter to measure DC voltage values 95 100 98 93  
B 188 B4-4 Do you use digital multimeters 97 96 93 79

0060 I 7. Troubleshooting DC Resistive Circuits 7.5/2

0061 I 7a. Given three questions, each consisting of a series circuit schematic diagram with three resistors, symptoms of a malfunction, and four options, select the option for each question that describes the malfunction IAW ST-KEP-10, Chap 7. Two of the three questions must be answered correctly. (1.5)  
CTS: 4a Meas: W

A 5 A1-5 Do you troubleshoot circuits containing conductors, fuses, lamps, switches, or batteries 95 96 86 94  
A 9 A1-9 Do you trace schematic or block diagrams of circuits containing resistors 92 92 73 79  
A 10 A1-10 Do you troubleshoot circuits to isolate a faulty resistor 53 83 59 55

0062 I 7b. Given three questions, each consisting of a parallel circuit schematic diagram with three resistors, symptoms of a malfunction, and four options, select the option for each question that describes the malfunction IAW ST-KEP-10, Chap 7. Two of the three questions must be answered correctly. (1)  
CTS: 4a Meas: W

A 5 A1-5 Do you troubleshoot circuits containing conductors, fuses, lamps, switches, or batteries 95 96 86 94

Y Task Y Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B
A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
A 10	Al-10 Do you troubleshoot circuits to isolate a faulty resistor	53	83	59	55

0063 I 7c. Given three questions, each consisting of a series-parallel circuit schematic diagram with three resistors, symptoms of a malfunction and four options, select the option for each question that describes the malfunction IAW ST-KEP-10, Chap 7. Two of the three questions must be answered correctly.  
CTS: 4e Meas: W (0/2)

A 5	Al-5 Do you troubleshoot circuits containing conductors, fuses, lamps, switches, or batteries	95	96	86	94
A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
A 10	Al-10 Do you troubleshoot circuits to isolate a faulty resistor	53	83	59	55

0064 I 7d. Given a multimeter, DC Power Supply, a trainer consisting of a three resistor series-parallel circuit and three individually inserted malfunctions, locate the faulty component IAW ST-KEP-10, Chap 7. Two of the three malfunctions must be identified correctly.  
CTS: 4e, 5d Meas: PC, W (5)

A 5	Al-5 Do you troubleshoot circuits containing conductors, fuses, lamps, switches, or batteries	95	96	86	94
A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
A 12	Al-12 Do you calculate the value of a resistor required for a circuit	15	41	23	26
B 153	B1-1 Do you use the multimeter to measure DC voltage values	95	100	98	93
B 156	B1-4 Do you use the multimeter to measure DC current values	73	72	54	63
B 159	B1-7 Do you use the multimeter to measure circuit resistance	85	86	69	75
B 160	B1-8 Do you use the multimeter to measure component resistance	86	90	65	69
B 188	B4-4 Do you use digital multimeters	97	96	93	79

0065 II. AC Circuits

D	I Task	Y Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B

0066 II 1. Alternating Current 4.5/2

0067 II 1a. Given a sinewave pictorial with letters indicating cycle, alternation, peak amplitude and peak-to-peak amplitude with four terms identifying these areas, match each letter with its respective term IAW ST-KEP-20, Chap 1. Three out of four matched must be correct. CTS: 6 Meas: W (0/.5)

A 3 A1-3 Do you use basic AC electrical/electronic terms 97 96 93 93

0068 II 1b. Given three questions each containing an effective voltage with four options expressed in peak voltage and applicable formulas, select the option for each question which indicates the value of the peak voltage IAW ST-KEP-20, Chap 1. Two out of three of the responses must be correct. CTS: 6 Meas: W (0/.5)

A 7 A1-7 Do you calculate values of AC effective voltage, average voltage, or peak-to-peak voltage 66 51 42 39

0069 II 1c. Given three questions each containing an effective voltage with four options expressed in peak-to-peak voltage and applicable formulas, select an option for each question which indicates the value of the peak-to-peak voltage IAW ST-KEP 20, Chap 1. Two out of three of the responses must be correct. CTS: 6 Meas: W (0/.5)

A 7 A1-7 Do you calculate values of AC effective voltage, average voltage, or peak-to-peak voltage 66 51 42 39

D	T Task	Y Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B

0070 II 1d. Given three questions each containing a peak voltage and four options expressed in effective voltage with applicable formulas, select an option for each question which indicates the value of the effective voltage IAW ST-KEP-20, Chap 1. Two out of three responses must be correct. CTS: 6 Meas: W (0/.5)

A	7	Al-7 Do you calculate values of AC effective voltage, average voltage, or peak-to-peak voltage	66	51	42	39

0071 II 1e. Given three questions each containing a peak voltage and four options expressed in peak-to-peak voltage with applicable formulas, select an option for each question which indicates the value of the peak-to-peak voltage IAW ST-KEP-20, Chap 1. Two out of three responses must be correct. CTS: 6 Meas: W (.5)

A	7	Al-7 Do you calculate values of AC effective voltage, average voltage, or peak-to-peak voltage	66	51	42	39

0072 II 1f. Given three questions each containing a peak-to-peak voltage and four options expressed in effective voltage with applicable formulas, select the option for each question which indicates the value of the effective voltage IAW ST-KEP-20, Chap 1. Two of the three responses must be correct. CTS: 6 Meas: W (.5)

A	7	Al-7 Do you calculate values of AC effective voltage, average voltage, or peak-to-peak voltage	66	51	42	39

0073 II 1g. Given three questions each containing a peak-to-peak voltage and four options expressed in peak voltage with applicable formulas, select the option for each question which indicates the value of the peak voltage IAW ST-KEP-20, Chap 1. Two of the three responses must be correct. CTS: 6 Meas: W (.5)

A	7	Al-7 Do you calculate values of AC effective voltage, average voltage, or peak-to-peak voltage	66	51	42	39

D  
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Y Nbr

Task Title

455 455 456 456  
X4 X6 X1A X1B

0074 II 1h. Given a pictorial representation of the frequency spectrum with letters representing audio, radio and microwave frequency ranges with three statements identifying these ranges, match each letter to its respective range IAW ST-KEP-20, Chap 1. Two of the three must be matched correctly.  
CTS: 6 Meas: W

(.5)

A 8 A1-8 Do you calculate values of frequency, phase relationship, or wave length

64 51 46 50

0075 II 1i. Given a pictorial representation of the frequency spectrum with letters representing VLF, LF, MF, and HF frequency ranges with four statements identifying these ranges, match each letter with the statement which identifies its range IAW ST-KEP-20, Chap 1. Three of the four must be matched correctly. CTS: 6 Meas: W

(.5)

A 8 A1-8 Do you calculate values of frequency, phase relationship, or wave length

64 51 46 50

0076 II 1j. Given a pictorial representation of the frequency spectrum with letters representing VHF, UHF, SHF, and EHF frequency ranges and four statements identifying these ranges, match each letter with the statement which identifies its range IAW ST-KEP-20, Chap 1. Three of the four must be matched correctly. CTS: 6 Meas: W

(.5)

A 8 A1-8 Do you calculate values of frequency, phase relationship, or wave length

64 51 46 50

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T	Task						
Y	Nbr						
	Task Title						
		455	455	456	456	456	
		X4	X6	X1A	X1B		

0077 II 1k. Given three questions each containing the frequency of a sine wave and applicable formulas with four options for each question that states the period for the given frequency IAM ST-KEP-20, Chap 1. Two of the three questions must be answered correctly. CTS: 6 Meas: W (.5)

A	8	Al-8 Do you calculate values of frequency, phase relationship, or wave length	64	51	46	50
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0078 II 1l. Given three questions each containing the period of a sine wave and applicable formulas with four options for each question indicating frequency, select the option for each question that indicates the frequency for the given period IAM ST-KEP-20, Chap 1. Two of the three questions must be answered correctly. CTS: 6 Meas: W (.5)

A	8	Al-8 Do you calculate values of frequency, phase relationship, or wave length	64	51	46	50
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0079 II 1m. Given three questions pertaining to wavelength each with three options, select the option for each question which defines wavelength IAM ST-KEP-20, Chap 1. Two out of the three must be answered correctly. CTS: 6 Meas: W (.5)

A	8	Al-8 Do you calculate values of frequency, phase relationship, or wave length	64	51	46	50
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0080 II 2. Signal Generator and Oscilloscope 6.5/2



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Y Nbr

Task Title

455 455 456 456  
X4 X6 X1A X1B

0081 II 2a. Given a list of the controls on the FUNCTION GENERATOR, and a list of four statements describing their purpose, match each control to its function IAW ST-KEP-20, Chap 2. Three of the four matches must be correct. CTS: 39 Meas: W (0.5)

B 183 B3-12 Do you use multi-function (square/sine/triangular) signal generators 25 52 44 26

0082 II 2b. Given three questions each consisting of a pictorial diagram of the FUNCTION GENERATOR with indicated FREQUENCY, FREQUENCY MULTIPLIER, and STEP control setting and four options, select the option for each question that states the output frequency IAW ST-KEP-20, Chap 2. Two out of the three questions must be answered correctly. CTS: 39 Meas: W (0.5)

B 183 B3-12 Do you use multi-function (square/sine/triangular) signal generators 25 52 44 26

0083 II 2c. Given three questions, each containing a pictorial of an oscilloscope display with indicated attenuator and sweep control setting and four options, select the option for each question that indicates the peak-to-peak value of the displayed signal IAW ST-KEP-20, Chap 2. Two of the three questions must be correct. CTS: 16a Meas: W (.5/.5)

B 163 B2-3 Do you use the oscilloscope to measure AC voltage 75 71 78 71  
B 170 B2-10 Do you use attenuator probes with oscilloscopes 66 63 60 57

0084 II 2d. Given three questions, each containing a pictorial of an oscilloscope display with indicated attenuator and sweep control settings and four options, select the option for each question that indicates the frequency of the displayed signal IAW ST-KEP-20, Chap 2. Two of the three questions must be correct. CTS: 16b, 16c Meas: W (0/1)

B 161 B2-1 Do you use the oscilloscope to measure time to determine frequency 85 65 77 71

D T Y	Task Title	455 X4	455 X6	456 X1A	456 X1B
B 170	B2-10 Do you use attenuator probes with oscilloscopes	66	63	60	57

0085 II 2a. Given an oscilloscope, trainer, and DC power supply with a preset voltage, measure the DC voltage within + or - 10 percent accuracy IAW ST-KEP-20, Chap 2. CTS: 16a Meas: PC, W (1/.5)

B 164	B2-4 Do you use the oscilloscope to measure DC voltage	88	71	82	68
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0086 II 2f. Given an oscilloscope, trainer, and function generator with a preset voltage, measure the peak-to-peak amplitude of the AC voltage within + or - 10 percent accuracy IAW ST-KEP-20, Chap 2. CTS: 16a Meas: PC, W (1)

B 163	B2-3 Do you use the oscilloscope to measure AC voltage	75	71	78	71
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0087 II 2g. Given an oscilloscope, trainer, applicable formulas and function generator with preset frequency, determine the preset frequency within + or - 10 percent accuracy IAW ST-KEP-20, Chap 2. CTS: 16b, 16c Meas: PC, W (1.5)

B 161	B2-1 Do you use the oscilloscope to measure time to determine frequency	85	65	77	71
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0088 II 2h. Given a dual trace oscilloscope, trainer, function generator with preset voltage and frequency, determine the phase relationship of two signals having the same frequency within + or - 10 percent accuracy IAW ST-KEP-20, Chap 2. CTS: 16d Meas: PC, W (1.5)

B 169	B2-9 Do you use the oscilloscope to observe phase relationships	75	63	53	47
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0089 II 3. Capacitors and Capacitive Reactance 7/4

D T Task Y Mbr	Task Title	455 X4	455 X6	456 X1A	456 X1B

0090 II 3a. Given three questions pertaining to changes in physical factors affecting capacitance, each with three options, and applicable formula, select the option for each question which describes the effect of the given change on capacitance, IAW ST-KEP-20, Chap 3. Two of the three questions must be answered correctly. CTS: 8a Meas: W (1)

A 27 A1-27 Do you trace schematic or block diagrams of circuits containing capacitors 85 93 73 71

0091 II 3b. Given three questions concerning capacitance, each with four options, select the option for each question that identifies the symbol for capacitance IAW ST-KEP-20, Chap 3. Two of the three questions must be answered correctly. CTS: 8a Meas: W (0/.5)

A 27 A1-27 Do you trace schematic or block diagrams of circuits containing capacitors 85 93 73 71

0092 II 3c. Given capacitor pictorials of rotor-stator, compression, electrolytic, paper, and ceramic type capacitors and a list of their types, match each type to its respective pictorial IAW ST-KEP-20, Chap 3. Three of the five must be matched correctly. CTS: 8a Meas: W (0/.5)

A 27 A1-27 Do you trace schematic or block diagrams of circuits containing capacitors 85 93 73 71

A 32 A1-32 Do you calibrate or adjust circuits using variable capacitors 19 70 34 25

D T Y	Task Title	455 X4	455 X6	456 X1A	456 X1B

0093 II 3d. Given three questions each containing four options pertaining to the phase relationship of current and voltage, select the option for each question that describes the phase relationship between current and voltage across a capacitor IAW ST-KEP-20, Chap 3. Two out of the three questions must be answered correctly. CTS: 8a Meas: W (0/1)

A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A 31	Al-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors	19	39	22	17

0094 II 3e. Given three questions each with four options pertaining to capacitive reactance and applicable formulas, select the option for each question that describes the effects of changes in frequency and capacitance on capacitive reactance IAW ST-KEP-20, Chap 3. Two of the three questions must be answered correctly. CTS: 8b Meas: W (1)

A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
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0095 II 3f. Given three questions, each containing a three capacitor series circuit schematic diagram, with individual capacitance values indicated, applicable formulas and four options, select the option for each question that states total circuit capacitance IAW ST-KEP-20, Chap 3. Two of the three questions must be answered correctly. CTS: 8a, 8c Meas: W (1)

A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A 29	Al-29 Do you calculate values of circuit total capacitance	14	33	18	14

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Y Nbr

Task Title

455 455 456 456  
X4 X6 X1A X1B

0096 II 3g. Given three questions, each containing a three capacitor series circuit schematic diagram, applied frequency, total circuit capacitance indicated, applicable formulas and four options, select the option for each question that states total circuit reactance, IAW ST-KEP-20, Chap 3. Two of the three questions must be answered correctly. CTS: 8b, 8c Meas: W (1)

A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A 30	Al-30 Do you calculate values of circuit or component capacitive reactance	14	33	17	11

0097 II 3h. Given three questions, each containing a three capacitor series circuit schematic diagram, total circuit reactance, applied voltage, applicable formula and four options, select the option for each question that states total circuit current IAW ST-KEP-20, Chap 3. Two of the three questions must be answered correctly. CTS: 8c Meas: W (1)

A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A 31	Al-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors	19	39	22	17

0098 II 3i. Given three questions, each containing a three capacitor series circuit diagram, individual reactance values, total circuit current, applicable formulas and four options, select the option for each question that indicates the voltage developed across a selected capacitor IAW ST-KEP-20, Chap 3. Two of the three questions must be answered correctly. CTS: 8c Meas: W (1)

A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A 37	Al-37 Do you calculate transformer voltage or current step-up or step-down ratios	27	46	24	21

D	T Task	Y Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B
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0099 II 3j. Given three questions, each containing a three capacitor parallel circuit schematic diagram, individual capacitor values, applicable formulas and four options, select the option for each question that states the total circuit capacitance IAW ST-KEP-20, Chap 3. Two of the three questions must be answered correctly.  
CTS: 8a, 8c Meas: W (1)

A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A 29	Al-29 Do you calculate values of circuit total capacitance	14	33	18	14

0100 II 3k. Given three questions, each containing a three capacitor parallel circuit schematic diagram, total capacitance, applied frequency, applicable formulas and four options, select the option for each question that states total circuit reactance IAW ST-KEP-20, Chap 3. Two of the three questions must be answered correctly. CTS: 8b, 8c Meas: W (0/1)

A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A 30	Al-30 Do you calculate values of circuit or component capacitive reactance	14	33	17	11

0101 II 3l. Given a parallel circuit schematic diagram consisting of three capacitors in parallel with individual reactance values and applied voltage indicated, applicable formulas and three options for each branch current, select an option for each branch which correctly indicates its current IAW ST-KEP-20, Chap 3. Two of the three questions must be answered correctly. CTS: 8c Meas: W (0/1)

A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A 31	Al-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors	19	39	22	17

D	T	Task Title	455 X4	455 X6	456 X1A	456 X1B

0102 II 4. Inductors, Inductive Reactance and Transformers 8.5/2

0103 II 4a. Given three questions each with four options and applicable formula pertaining to the factors affecting the strength of an electromagnetic field, select the option for each question which describes the effect changes in these factors have on the strength of the electromagnetic field IAW SI-KEP-20, Chap 4. Two of the three questions must be answered correctly.  
CTS: 7a Meas: W (1)

A 20 A1-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils 39 84 56 54

0104 II 4b. Given three questions each with four options, select the option for each question that identifies the symbol for inductance and the name and symbol for its unit of measurement IAW SI-KEP-20, Chap 4. Two out of three questions must be answered correctly.  
CTS: 7a Meas: W (0.5)

A 20 A1-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils 39 84 56 54

0105 II 4c. Given three questions each with four options pertaining to current and voltage phase relationships, select the option for each question that describes the phase relationship of current and voltage across an inductor IAW SI-KEP-20, Chap 4. Two of the three must be answered correctly. CTS: 7a Meas: W (0.5)

A 24 A1-24 Do you calculate values of circuit voltage or current in circuits containing inductors 10 34 19 11

D							
T	Task						
Y	Nbr						
	Task Title						

0106 II 4d. Given three questions each with four options pertaining to inductive reactance and applicable formulas, select the option for each frequency that describes the effects of changes in frequency and inductance on inductive reactance IAW ST-KEP-20, Chap 4. Two of the three questions must be answered correctly. CTS: 7b Meas: W (0.5)

A	23	Al-23 Do you calculate values of circuit or component inductive reactance	10	30	12	10
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0107 II 4e. Given three questions, each containing a three inductor series circuit diagram, individual inductance values, applicable formulas and four options, select the option for each question that states total circuit inductance IAW ST-KEP-20, Chap 4. Two of the three questions must be answered correctly. CTS: 7a, 7c Meas: W (1)

A	20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54
A	22	Al-22 Do you calculate values of circuit total inductance	10	34	14	11

0108 II 4f. Given three questions, each containing a three inductor series circuit schematic diagram, applied frequency, total circuit inductance, applicable formulas and four options, select the option for each question that states total circuit reactance, IAW ST-KEP-20, Chap 4. Two of the three questions must be answered correctly. CTS: 7b, 7c Meas: W (1)

A	20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54
A	23	Al-23 Do you calculate values of circuit or component inductive reactance	10	30	12	10



D	T Task	Y Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B
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0109 II 4g. Given three questions, each containing a three inductor series circuit schematic diagram, applied voltage, total circuit reactance, applicable formulas and four options, select the option for each question that states total circuit current IAW ST-KEP-20, Chap 4. Two of the three questions must be answered correctly.  
CTS: 7c Meas: W (0.5)

A	20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54
A	24	Al-24 Do you calculate values of circuit voltage or current in circuits containing inductors	10	34	19	11

0110 II 4h. Given three questions, each containing a three inductor series circuit schematic diagram, individual reactance values, total circuit current, applicable formulas and four options, select the option for each question that states the voltage developed across a selected inductor IAW ST-KEP-20, Chap 4. Two of the three questions must be answered correctly.  
CTS: 7c Meas: W (1)

A	20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54
A	24	Al-24 Do you calculate values of circuit voltage or current in circuits containing inductors	10	34	19	11

0111 II 4i. Given three questions, each containing a three inductor parallel circuit schematic diagram, individual inductance values, applicable formulas and four options, select the option for each question that states total circuit inductance IAW ST-KEP-20, Chap 4. Two of the three questions must be answered correctly.  
CTS: 7a, 7c Meas: W (0/1)

A	20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54
A	22	Al-22 Do you calculate values of circuit total inductance	10	34	14	11

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0112 II 4j. Given three questions, each containing a three inductor parallel circuit schematic diagram, total inductance, applied frequency, applicable formulas, and four options, select the option for each question that indicates total circuit reactance, IAW SI-KEP-20, Chap 4. Two of the three questions must be answered correctly. CTS: 7b, 7c Meas: W (0/1)

A 20 A1-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils 39 84 56 54  
 A 23 A1-23 Do you calculate values of circuit or component inductive reactance 10 30 12 10

0113 II 4k. Given a parallel circuit schematic diagram consisting of three inductors with individual reactance values, and applied voltage indicated, applicable formulas and three options for each branch current, select an option for each branch which indicates the correct branch current IAW SI-KEP-20, Chap 4. Two of the three questions must be correctly answered.  
 CTS: 7c Meas: W (1)

A 20 A1-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils 39 84 56 54  
 A 23 A1-23 Do you calculate values of circuit or component inductive reactance 10 30 12 10

0114 II 4l. Given three questions, each with three options pertaining to transformer induction, select the option for each question that states the requirements for inducing a voltage in the secondary of a transformer IAW SI-KEP-20, Chap 4. Two of the three must be answered correctly. CTS: 9a Meas: W (0.5)

A 38 A1-38 Do you calculate impedance of transformers 17 31 9 11

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0115 II 4m. Given three questions, each containing a schematic diagram of a transformer, different peak input voltage, turns ratio, and three options, select the option for each question that indicates the correct output voltage, IAW ST-KEP-20, Chap 4. Two of the three questions must be answered correctly.  
CTS: 9a Meas: W (0.5)

A 35	Al-35 Do you trace schematic or block diagrams of circuits containing transformers	86	93	64	61
A 37	Al-37 Do you calculate transformer voltage or current step-up or step-down ratios	27	46	24	21

0116 II 4n. Given four schematic diagrams of transformers with indicated input signals, to include one diagram with no sense dots and three diagrams with different arrangements of sense dots and two statements pertaining to the phase relationship of the output signal (In phase, 180 degrees out of phase), select a statement that identifies the relationship of the output to the input signal for each given circuit IAW ST-KEP-20, Chap 4. Three of the four questions must be answered correctly.  
CTS: 9a Meas: W (0.5)

A 35	Al-35 Do you trace schematic or block diagrams of circuits containing transformers	86	93	64	61
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0117 II 5. Relays 1.5/0

0118 II 5a. Given three questions, each with a four contact relay schematic diagram and four options, select the option for each question that states the making contacts when the relay is energized IAW ST-KEP-20, Chap 5. Two of the three questions must be answered correctly. CTS: 7e, 15 Meas: PC

A 15	Al-15 Do you trace schematic or block diagrams of circuits containing relays	93	94	82	82
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D	T	Y	Task Title	455 X4	455 X6	456 X1A	456 X1B

## 0119 III. AC Circuits

## 0120 III 1. Series RCL Circuits

6/2.5

0121 III 1a. Given three questions, containing a series RCL circuit diagram with indicated values of applied voltage, frequency, resistance, capacitive reactance, and inductive reactance, applicable formulas and three options for each question, select the option for each question which indicates the effects on total impedance when resistance is changed IAW ST-KEP-30, Chap 1. Two of the three questions must be answered correctly.

CTS: 10a Meas: W

(0/2)

A	9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
A	20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54
A	22	Al-22 Do you calculate values of circuit total inductance	10	34	14	11
A	23	Al-23 Do you calculate values of circuit or component inductive reactance	10	30	12	10
A	24	Al-24 Do you calculate values of circuit voltage or current in circuits containing inductors	10	34	19	11
A	27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A	29	Al-29 Do you calculate values of circuit total capacitance	14	33	18	14
A	30	Al-30 Do you calculate values of circuit or component capacitive reactance	14	33	17	11
A	31	Al-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors	19	39	22	17
E	310	El-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	39	47	29	25
E	314	El-5 Do you calculate values of impedance, voltage, or current in RCL circuits	8	12	14	7

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X4 X6 X1A X1B

0122 III lb. Given three questions, each with a schematic diagram of a series RCL circuit with indicated values of resistance, capacitance, inductance, applicable formula and four options, select the option for each question which indicates the resonant frequency, IAW ST-KEP-30, Chap 1. Two of the three questions must be answered correctly. CTS: 10b Meas: W (1)

A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54
A 22	Al-22 Do you calculate values of circuit total inductance	10	34	14	11
A 23	Al-23 Do you calculate values of circuit or component inductive reactance	10	30	12	10
A 24	Al-24 Do you calculate values of circuit voltage or current in circuits containing inductors	10	34	19	11
A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A 30	Al-30 Do you calculate values of circuit or component capacitive reactance	14	33	17	11
A 31	Al-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors	19	39	22	17
E 310	E1-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	39	47	29	25

0123 III lc. Given the frequency response curve of a series RCL circuit and three questions with three options each, pertaining to circuit behavior as frequency approaches resonance, select the option for each question which states the effect on line current, total impedance and circuit operation respectively as resonance is approached, IAW ST-KEP-30, Chap 1. Two of three questions must be answered correctly. CTS: 10a Meas: W (1)

A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54
A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
E 310	E1-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	39	47	29	25

D	T	Task Title	455 X4	455 X6	456 X1A	456 X1B
E	314	E1-5 Do you calculate values of impedance, voltage, or current in RCL circuits	8	12	14	7

0124 III 1d. Given the frequency response curve of a series RCL circuit and three questions with three options each, pertaining to circuit behavior as frequency departs from resonance, select the option for each question which states the effect on line current, total impedance and circuit operation respectively as frequency departs from resonance, IAW ST-KEP-30, Chap 1. Two of three questions must be answered correctly. CTS: 10a Meas: W (1)

A	9	A1-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
A	20	A1-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54
A	22	A1-22 Do you calculate values of circuit total inductance	10	34	14	11
A	23	A1-23 Do you calculate values of circuit or component inductive reactance	10	30	12	10
A	24	A1-24 Do you calculate values of circuit voltage or current in circuits containing inductors	10	34	19	11
A	27	A1-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A	29	A1-29 Do you calculate values of circuit total capacitance	14	33	18	14
A	30	A1-30 Do you calculate values of circuit or component capacitive reactance	14	33	17	11
A	31	A1-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors	19	39	22	17
E	310	E1-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	39	47	29	25
E	314	E1-5 Do you calculate values of impedance, voltage, or current in RCL circuits	8	12	14	7

D	T Task	Y Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B

0125 III 1e. Given three questions, containing a series RCL circuit diagram with indicated values of applied voltage, frequency, resistance, capacitive reactance, inductive reactance, applicable formulas and three options for each question, select the option for each question which indicates the effect on total impedance when capacitance is changed without passing through resonance, IAW ST-KEP-30, Chap 1. Two of the three questions must be answered correctly.  
CTS: 10a Meas: W (1)

A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54
A 22	Al-22 Do you calculate values of circuit total inductance	10	34	14	11
A 23	Al-23 Do you calculate values of circuit or component inductive reactance	10	30	12	10
A 24	Al-24 Do you calculate values of circuit voltage or current in circuits containing inductors	10	34	19	11
A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A 29	Al-29 Do you calculate values of circuit total capacitance	14	33	18	14
A 30	Al-30 Do you calculate values of circuit or component capacitive reactance	14	33	17	11
A 31	Al-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors	19	39	22	17
E 310	E1-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	39	47	29	25
E 314	E1-5 Do you calculate values of impedance, voltage, or current in RCL circuits	8	12	14	7

0126 III 1f. Given three questions, containing a series RCL circuit diagram with indicated values of applied voltage, frequency, resistance, capacitive reactance and inductive reactance, applicable formulas and three options for each question, select the option for each question which indicates the effect on total impedance when inductance is changed without passing through resonance, IAW ST-KEP-30, Chap 1. Two of the three questions must be answered correctly.  
CTS: 10a Meas: W (1)

A 5	Al-5 Do you troubleshoot circuits containing conductors, fuses, lamps, switches, or batteries	95	96	86	94
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D T Y	Task Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B
A	20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54
A	22	Al-22 Do you calculate values of circuit total inductance	10	34	14	11
A	23	Al-23 Do you calculate values of circuit or component inductive reactance	10	30	12	10
A	24	Al-24 Do you calculate values of circuit voltage or current in circuits containing inductors	10	34	19	11
A	27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A	29	Al-29 Do you calculate values of circuit total capacitance	14	33	18	14
A	30	Al-30 Do you calculate values of circuit or component capacitive reactance	14	33	17	11
A	31	Al-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors	19	39	22	17
E	310	El-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	39	47	29	25
E	314	El-5 Do you calculate values of impedance, voltage, or current in RCL circuits	8	12	14	7

0127 III 1g. Given three questions, containing a series RCL circuit diagram with indicated values of applied voltage, frequency, resistance, capacitive reactance and inductive reactance, applicable formulas and three options for each question, select the option which indicates the effects on total impedance when applied voltage is changed, IAW SI-KEP-30, Chap 1. Two of the three questions must be answered correctly.  
CTS: 10a Meas: W (0.5)

A	9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
A	20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54
A	22	Al-22 Do you calculate values of circuit total inductance	10	34	14	11
A	23	Al-23 Do you calculate values of circuit or component inductive reactance	10	30	12	10
A	24	Al-24 Do you calculate values of circuit voltage or current in circuits containing inductors	10	34	19	11
A	27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A	29	Al-29 Do you calculate values of circuit total capacitance	14	33	18	14
A	30	Al-30 Do you calculate values of circuit or component capacitive reactance	14	33	17	11
A	31	Al-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors	19	39	22	17
E	310	El-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	39	47	29	25



D	T Task	Y Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B
E	314		E1-5 Do you calculate values of impedance, voltage, or current in RCL circuits	8	12	14	7

0128 III 1h. Given three questions, containing a series RCL circuit diagram with indicated values of applied voltage, frequency, resistance, capacitive reactance and inductive reactance, applicable formulas and three options for each question, select the option for each question which indicates the effects on total impedance when frequency is changed without passing through resonance, IAW ST-KEP-30, Chap 1. Two of the three questions must be answered correctly.  
CTS: 10a Meas: W (.5/.5)

A	9		A1-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
A	20		A1-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54
A	22		A1-22 Do you calculate values of circuit total inductance	10	34	14	11
A	23		A1-23 Do you calculate values of circuit or component inductive reactance	10	30	12	10
A	24		A1-24 Do you calculate values of circuit voltage or current in circuits containing inductors	10	34	19	11
A	27		A1-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A	29		A1-29 Do you calculate values of circuit total capacitance	14	33	18	14
A	30		A1-30 Do you calculate values of circuit or component capacitive reactance	14	33	17	11
A	31		A1-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors	19	39	22	17
E	310		E1-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	39	47	29	25
E	314		E1-5 Do you calculate values of impedance, voltage, or current in RCL circuits	8	12	14	7

0129 III 2. Parallel RCL Circuits 6/2.5

D	T Task	Y Mbr	Task Title	455 X4	455 X6	456 X1A	456 X1B

0130 III 2a. Given three questions, containing a parallel RCL circuit diagram with indicated values of applied voltage, frequency, resistance, capacitive reactance, inductive reactance, applicable formulas and three options for each question, select the option for each question which indicates the effects on total impedance when resistance is changed IAW ST-KEP-30, Chap 2. Two of the three questions must be answered correctly. CTS: 10a Meas: W (.5/1.5)

A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54
A 22	Al-22 Do you calculate values of circuit total inductance	10	34	14	11
A 23	Al-23 Do you calculate values of circuit or component inductive reactance	10	30	12	10
A 24	Al-24 Do you calculate values of circuit voltage or current in circuits containing inductors	10	34	19	11
A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A 29	Al-29 Do you calculate values of circuit total capacitance	14	33	18	14
A 30	Al-30 Do you calculate values of circuit or component capacitive reactance	14	33	17	11
A 31	Al-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors	19	39	22	17
E 310	El-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	39	47	29	25
E 314	El-5 Do you calculate values of impedance, voltage, or current in RCL circuits	8	12	14	7

0131 III 2b. Given three questions each with a parallel RCL circuit diagram with indicated values of resistance, inductance, and capacitance, applicable formulas and four options, select the option for each question which indicates the resonant frequency IAW ST-KEP-30, Chap 2. Two of the three questions must be answered correctly. CTS: 10b Meas: W (0.5)

A 5	Al-5 Do you troubleshoot circuits containing conductors, fuses, lamps, switches, or batteries	95	96	86	94
A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54
A 22	Al-22 Do you calculate values of circuit total inductance	10	34	14	11

D	T Tsk	Task Title	455 X4	455 X6	456 X1A	456 X1B
	Y Nbr					
A	23	Al-23 Do you calculate values of circuit or component inductive reactance	10	30	12	10
A	24	Al-24 Do you calculate values of circuit voltage or current in circuits containing inductors	10	34	19	11
A	27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A	29	Al-29 Do you calculate values of circuit total capacitance	14	33	18	14
A	30	Al-30 Do you calculate values of circuit or component capacitive reactance	14	33	17	11
A	31	Al-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors	19	39	22	17
E	310	El-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	39	47	29	25

0132 III 2c. Given the frequency response curve of a parallel RCL circuit and three questions with three options each, pertaining to circuit behavior as frequency approaches resonance, select the option for each question which states the effect upon line current, total impedance and circuit operation respectively as resonance is approached, IAW SI-KEP-30, Chap 2. Two out of three questions must be answered correctly. CTS: 10a, 10b Meas: W (1)

A	9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
A	20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54
A	22	Al-22 Do you calculate values of circuit total inductance	10	34	14	11
A	23	Al-23 Do you calculate values of circuit or component inductive reactance	10	30	12	10
A	24	Al-24 Do you calculate values of circuit voltage or current in circuits containing inductors	10	34	19	11
A	27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A	29	Al-29 Do you calculate values of circuit total capacitance	14	33	18	14
A	30	Al-30 Do you calculate values of circuit or component capacitive reactance	14	33	17	11
A	31	Al-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors	19	39	22	17
E	310	El-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	39	47	29	25
E	314	El-5 Do you calculate values of impedance, voltage, or current in RCL circuits	8	12	14	7

D	T Tsk	Y Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B

0133 III 2d. Given the frequency response curve of a parallel RCL circuit and three questions with three options each, pertaining to circuit behavior as frequency departs from resonance, select the option for each question which states the effect upon line current, total impedance and circuit operation respectively as frequency departs from resonance IAW ST-KEP-30, Chap 2. Two of three questions must be answered correctly. CTS: 10a, 10b Meas: W (1)

A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54
A 22	Al-22 Do you calculate values of circuit total inductance	10	34	14	11
A 23	Al-23 Do you calculate values of circuit or component inductive reactance	10	30	12	10
A 24	Al-24 Do you calculate values of circuit voltage or current in circuits containing inductors	10	34	19	11
A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A 29	Al-29 Do you calculate values of circuit total capacitance	14	33	18	14
A 30	Al-30 Do you calculate values of circuit or component capacitive reactance	14	33	17	11
A 31	Al-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors	19	39	22	17
E 310	El-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	39	47	29	25
E 314	El-5 Do you calculate values of impedance, voltage, or current in RCL circuits	8	12	14	7

0134 III 2e. Given three questions, containing a parallel RCL circuit diagram with indicated values of applied voltage, frequency, resistance, capacitive reactance and inductive reactance, applicable formulas and three options for each question, select the option which indicates the effects on total impedance when capacitance is changed without passing through resonance IAW ST-KEP-30, Chap 2. Two of the three questions must be answered correctly. CTS: 10a Meas: W (1)

A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54

D T Tsk Y Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B
A 22	Al-22 Do you calculate values of circuit total inductance	10	34	14	11
A 23	Al-23 Do you calculate values of circuit or component inductive reactance	10	30	12	10
A 24	Al-24 Do you calculate values of circuit voltage or current in circuits containing inductors	10	34	19	11
A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A 29	Al-29 Do you calculate values of circuit total capacitance	14	33	18	14
A 30	Al-30 Do you calculate values of circuit or component capacitive reactance	14	33	17	11
A 31	Al-31 Do you calculate values of circuit or component voltage or current in circuits containing capacitors	19	39	22	17
E 310	EI-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	39	47	29	25
E 314	EI-5 Do you calculate values of impedance, voltage, or current in RCL circuits	8	12	14	7

0135 III 2f. Given three questions, containing a parallel RCL circuit diagram with indicated values of applied voltage, frequency, resistance, capacitive reactance and inductive reactance, applicable formulas and three options for each question, select the option for each question which indicates the effects on total impedance when inductance is changed without passing through resonance IAM ST-KEP-30, Chap 2. Two of the three questions must be answered correctly.  
CIS: 10a Meas: W (1)

A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54
A 23	Al-23 Do you calculate values of circuit or component inductive reactance	10	30	12	10
A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A 30	Al-30 Do you calculate values of circuit or component capacitive reactance	14	33	17	11
E 310	EI-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	39	47	29	25
E 314	EI-5 Do you calculate values of impedance, voltage, or current in RCL circuits	8	12	14	7

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Y Nbr

Task Title

455 455 456 456  
X4 X6 X1A X1B

0136 III 2g. Given three questions, containing a parallel RCL circuit diagram with indicated values of applied voltage, frequency, resistance, capacitive reactance and inductive reactance, applicable formulas and three options for each question, select the option for each question which indicates the effects on total impedance when applied voltage is changed IAW ST-KEP-30, Chap 2. Two of the three questions must be answered correctly.

CTS: 10a Meas: W (0/1)

A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54
A 23	Al-23 Do you calculate values of circuit or component inductive reactance	10	30	12	10
A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A 30	Al-30 Do you calculate values of circuit or component capacitive reactance	14	33	17	11
E 310	El-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	39	47	29	25
E 314	El-5 Do you calculate values of impedance, voltage, or current in RCL circuits	8	12	14	7

0137 III 2h. Given three questions, containing a parallel RCL circuit diagram with indicated values of applied voltage, frequency, resistance, capacitive reactance and inductive reactance, applicable formulas and three options for each question, select the option for each question which indicates the effects on total impedance when frequency is changed IAW ST-KEP-30, Chap 2. Two of the three questions must be answered correctly.

CTS: 10a Meas: W (1)

A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	3	84	56	54
A 23	Al-23 Do you calculate values of circuit or component inductive reactance	10	30	12	10
A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A 30	Al-30 Do you calculate values of circuit or component capacitive reactance	14	33	17	11

D	T	Task Title	455 X4	455 X6	456 X1A	456 X1B
E 310		E1-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	39	47	29	25
E 314		E1-5 Do you calculate values of impedance, voltage, or current in RCL circuits	8	12	14	7

0138 III 3. Troubleshooting RCL Circuits 10/1

0139 III 3a. Given a function generator, voltmeter, and trainer with schematic diagram of a series RCL circuit to be connected, determine the resonant frequency, bandpass and bandwidth within + or - 20 percent IAW KEP-SW-31. C'S: 1a, 10b, 39 Meas: PC, W (2)

B 154	B1-2 Do you use the multimeter to measure AC voltage values	97	98	93	87
B 175	B3-4 Do you use audio sine-wave signal generators	8	83	29	14
B 183	B3-12 Do you use multi-function (square/sine/triangular) signal generators	25	52	44	26
B 188	B4-4 Do you use digital multimeters	97	96	93	79
E 310	E1-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	39	47	29	25

0140 III 3b. Given three questions, each with three options pertaining to troubleshooting procedures, select the option for each question that describes how to isolate a malfunction in a series RCL circuit, IAW ST-KEP 30, Chap 3. Two of three questions must be answered correctly. CTS: 7d, 8d, 10c Meas: W (1/1)

A 9	A1-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
A 10	A1-10 Do you troubleshoot circuits to isolate a faulty resistor	53	83	59	55
A 20	A1-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54
A 21	A1-21 Do you troubleshoot circuits to isolate a faulty inductor, choke, or choke coil	29	77	45	37
A 27	A1-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A 28	A1-28 Do you troubleshoot circuits to isolate a faulty capacitor	53	84	58	49
E 310	E1-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	39	47	29	25

D	Tsk	Y Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B
E	311		E1-2 Do you troubleshoot RCL circuits to circuit level components	19	47	26	15
E	312		E1-3 Do you trace schematic or block diagrams of circuits containing resonant RCL circuits	25	43	24	18
E	313		E1-4 Do you troubleshoot resonant RCL circuits to circuit level components	8	40	19	9

0141 III 3c. Given three questions, each with three options pertaining to troubleshooting procedures, select the option for each question that describes how to isolate a malfunction in a parallel RCL circuit, IAW ST-KEP-30, Chap 3. Two of three questions must be answered correctly. CTS: 7d, 8d, 10c Meas: W (1)

A	9		A1-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
A	10		A1-10 Do you troubleshoot circuits to isolate a faulty resistor	53	83	59	55
A	20		A1-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54
A	21		A1-21 Do you troubleshoot circuits to isolate a faulty inductor, choke, or choke coil	29	77	45	37
A	27		A1-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A	28		A1-28 Do you troubleshoot circuits to isolate a faulty capacitor	53	84	58	49
E	310		E1-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	39	47	29	25
E	311		E1-2 Do you troubleshoot RCL circuits to circuit level components	19	47	1	15
E	312		E1-3 Do you trace schematic or block diagrams of circuits containing resonant RCL circuits	25	43	24	18
E	313		E1-4 Do you troubleshoot resonant RCL circuits to circuit level components	8	40	19	9

0142 III 3d. Given three questions each with a series RCL circuit schematic diagram with different malfunction symptoms and four options, select the option for each question that indicates the malfunction IAW ST-KEP-30, Chap 3. Two out of three must be answered correctly. CTS: 7d, 8d, 10c, Meas: W (1)

A	9		A1-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
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D T Y	Task Title	455 X4	455 X6	456 X1A	456 X1B
A 10	Al-10 Do you troubleshoot circuits to isolate a faulty resistor	53	83	59	55
A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54
A 21	Al-21 Do you troubleshoot circuits to isolate a faulty inductor, choke, or choke coil	29	77	45	37
A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A 28	Al-28 Do you troubleshoot circuits to isolate a faulty capacitor	53	84	58	49
E 310	El-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	39	47	29	25
E 311	El-2 Do you troubleshoot RCL circuits to circuit level components	19	47	26	15
E 312	El-3 Do you trace schematic or block diagrams of circuits containing resonant RCL circuits	25	43	24	18
E 313	El-4 Do you troubleshoot resonant RCL circuits to circuit level components	8	40	19	9

0143 III 3e. Given three questions each with a parallel RCL circuit schematic diagram with different malfunction symptoms and four options, select the option for each question that indicates the malfunction IAW ST-KEP-30, Chap 3. Two out of three questions must be answered correctly. CTS: 7d, 8d, 10c Meas: W (1)

A 9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
A 10	Al-10 Do you troubleshoot circuits to isolate a faulty resistor	53	83	59	55
A 20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54
A 21	Al-21 Do you troubleshoot circuits to isolate a faulty inductor, choke, or choke coil	29	77	45	37
A 27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A 28	Al-28 Do you troubleshoot circuits to isolate a faulty capacitor	53	84	58	49
A 33	Al-33 Do you ohm check capacitors	41	76	51	40
E 310	El-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	39	47	29	25
E 311	El-2 Do you troubleshoot RCL circuits to circuit level components	19	47	26	15
E 312	El-3 Do you trace schematic or block diagrams of circuits containing resonant RCL circuits	25	43	24	18
E 313	El-4 Do you troubleshoot resonant RCL circuits to circuit level components	8	40	19	9

D								
T	Task							
Y	Nbr							
	Task Title							

0144 III 3f. Given a multimeter, function generator and a trainer connected as a series RCL circuit with three separately inserted malfunctions, determine the malfunction IAW ST-KEP-30, Chap 3. Two of the three inserted malfunctions must be identified correctly. CTS: 5a, 5c, 5d, 7d, 8d, 10c  
Meas: PC, W (2)

A	9	Al-9 Do you trace schematic or block diagrams of circuits containing resistors	92	92	73	79
A	10	Al-10 Do you troubleshoot circuits to isolate a faulty resistor	53	83	59	55
A	14	Al-14 Do you ohm check resistors	69	82	63	66
A	20	Al-20 Do you trace schematic or block diagrams of circuits containing inductors, chokes, or choke coils	39	84	56	54
A	21	Al-21 Do you troubleshoot circuits to isolate a faulty inductor, choke, or choke coil	29	77	45	37
A	26	Al-26 Do you ohm check inductors	24	69	42	35
A	27	Al-27 Do you trace schematic or block diagrams of circuits containing capacitors	85	93	73	71
A	28	Al-28 Do you troubleshoot circuits to isolate a faulty capacitor	53	84	58	49
A	33	Al-33 Do you ohm check capacitors	41	76	51	40
E	310	El-1 Do you trace schematic or block diagrams of circuits containing resistive capacitive inductive (RCL) circuits	39	47	29	25
E	311	El-2 Do you troubleshoot RCL circuits to circuit level components	19	47	26	15
E	312	El-3 Do you trace schematic or block diagrams of circuits containing resonant RCL circuits	25	43	24	18
E	313	El-4 Do you troubleshoot resonant RCL circuits to circuit level components	8	40	19	9

0145 III 3g. Given a multimeter, function generator, and a trainer consisting of a connected transformer with three separately inserted malfunctions, determine the malfunction IAW ST-KEP-30, Chap 3. Two of the three inserted malfunctions must be identified correctly.  
CTS: 9b Meas: PC, W (2)

A	35	Al-35 Do you trace schematic or block diagrams of circuits containing transformers	86	93	64	61
A	40	Al-40 Do you ohm check transformers	51	75	38	36
A	41	Al-41 Do you measure transformer output voltage	66	77	50	48

D	T Task	Y Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B

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0146 III 4. Filters and Coupling 6/4

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0147 III 4a. Given three questions concerning filters, each with four options, select the option for each question that describes the frequency response of a low pass filter IAW ST-KEP-30, Chap 4. Two of the three questions must be answered correctly.  
CTS: 12 Meas: W (0/2)

D 292	D2-5 Do you perform tasks on capacitive power supply filters	19	39	32	21
D 293	D2-6 Do you perform tasks on inductive power supply filters	17	37	27	18
D 294	D2-7 Do you perform tasks on L-type power supply filters	8	33	25	13
D 295	D2-8 Do you perform tasks on Pi-type power supply filters	8	33	20	12
D 296	D2-9 Do you perform tasks on T-type power supply filters	7	35	13	11
D 298	D2-11 Do you perform tasks on inductive capacitive (LC) power supply filters	20	40	29	17
E 317	E2-1 Do you trace schematic or block diagrams of circuits containing frequency sensitive filters	56	59	39	41
E 322	E2-6 Do you perform tasks on low pass frequency sensitive filters	42	58	32	36

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0148 III 4b. Given three questions concerning filters, each with four options, select the option for each question that describes the frequency response of a high pass filter IAW ST-KEP-30, Chap 4. Two of the three questions must be answered correctly.  
CTS: 12 Meas: W (1)

D 292	D2-5 Do you perform tasks on capacitive power supply filters	19	39	32	21
D 293	D2-6 Do you perform tasks on inductive power supply filters	17	37	27	18
D 294	D2-7 Do you perform tasks on L-type power supply filters	8	33	25	13
D 295	D2-8 Do you perform tasks on Pi-type power supply filters	8	33	20	12
D 296	D2-9 Do you perform tasks on T-type power supply filters	7	35	13	11
D 298	D2-11 Do you perform tasks on inductive capacitive (LC) power supply filters	20	40	29	17
E 317	E2-1 Do you trace schematic or block diagrams of circuits containing frequency sensitive filters	56	59	39	41
E 323	E2-7 Do you perform tasks on high pass frequency sensitive filters	42	52	28	28

D	Tsk	Task Title	455	455	456	456
Y	Nbr		X4	X6	X1A	X1B

0149 III 4c. Given three questions concerning filters, each with four options, select the option for each question that describes the frequency response of a bandpass filter IAW ST-KEP-30, Chap 4. Two of the three questions must be answered correctly.  
CFS: 12 Meas: W (1/1.5)

D 292	D2-5 Do you perform tasks on capacitive power supply filters	19	39	32	21
D 293	D2-6 Do you perform tasks on inductive power supply filters	17	37	27	18
D 294	D2-7 Do you perform tasks on L-type power supply filters	8	33	25	13
D 295	D2-8 Do you perform tasks on Pi-type power supply filters	8	33	20	12
D 296	D2-9 Do you perform tasks on T-type power supply filters	7	35	13	11
D 298	D2-11 Do you perform tasks on inductive capacitive (LC) power supply filters	20	40	29	17
E 317	E2-1 Do you trace schematic or block diagrams of circuits containing frequency sensitive filters	56	59	39	41
E 324	E2-8 Do you perform tasks on band pass frequency sensitive filters	66	65	42	44

0150 III 4d. Given three questions concerning filters, each with four options, select the option for each question that describes the frequency response of a band reject filter IAW ST-KEP-30, Chap 4. Two of the three questions must be answered correctly.  
CFS: 12 Meas: W (0/1.5)

D 292	D2-5 Do you perform tasks on capacitive power supply filters	19	39	32	21
D 293	D2-6 Do you perform tasks on inductive power supply filters	17	37	27	18
D 294	D2-7 Do you perform tasks on L-type power supply filters	8	33	25	13
D 295	D2-8 Do you perform tasks on Pi-type power supply filters	8	33	20	12
D 296	D2-9 Do you perform tasks on T-type power supply filters	7	35	13	11
D 298	D2-11 Do you perform tasks on inductive capacitive (LC) power supply filters	20	40	29	17
E 317	E2-1 Do you trace schematic or block diagrams of circuits containing frequency sensitive filters	56	59	39	41
E 325	E2-9 Do you perform tasks on band-reject frequency sensitive filters	29	40	25	18

D  
T Task  
Y Nbr

Task Title

455 455 456 456  
X4 X6 X1A X1B

0151 III 4e. Given a schematic diagram of a direct coupled (DC) circuit and three questions with four options each, select the option for each question that describes the frequency response of DC coupling IAW ST-KEP-30, Chap 4. Two of the three questions must be answered correctly. CTS: 13 Meas: W (1)

C 226 C3-2 Do you trace schematic diagrams of coupling circuits 39 57 38 31  
C 229 C3-5 Do you perform tasks on direct coupling circuits 36 55 36 31

0152 III 4f. Given a schematic diagram of a resistor-capacitor (RC) coupled circuit and three questions with four options each, select the option for each question that describes the frequency response of RC coupling IAW ST-KEP-30, Chap 4. Two of the three questions must be answered correctly. CTS: 13 Meas: W (1)

C 226 C3-2 Do you trace schematic diagrams of coupling circuits 39 57 38 31  
C 230 C3-6 Do you perform tasks on capacitive-resistive coupling circuits 19 41 28 21

0153 III 4g. Given a schematic diagram of an inductor-capacitor (LC) coupled circuit and three questions with four options each, select the option for each question that describes the frequency response of L-C coupling IAW ST-KEP-30, Chap 4. Two out of the three questions must be answered correctly. CTS: 13 Meas: W (1)

C 226 C3-2 Do you trace schematic diagrams of coupling circuits 39 57 38 31  
C 231 C3-7 Do you perform tasks on capacitive-inductive coupling circuits 24 49 28 17

0154 III 4h. Given a schematic diagram of a transformer coupled circuit and three questions with four options each, select the option for each question that describes the frequency response of transformer coupling IAW ST-KEP-30, Chap 4. Two of the three questions must be answered correctly. CTS: 13 Meas: W (1)

A 35 A1-35 Do you trace schematic or block diagrams of circuits containing transformers 86 93 64 61

D	T Task							
Y	Mbr	Task Title						
C	232	C3-8 Do you perform tasks on transformer coupling circuits	455 X4	455 X6	456 X1A	456 X1B	21	

0155 POI E3AQR30020 009 ELECTRONIC PRINCIPLES  
Volume 2 of 4 Volumes

0156 IV. Solid State Devices and Applications

0157 IV 1. Diodes and Power Supplies

12/4

0158 IV 1a. Describe the conduction characteristics of a  
PN Junction Diode. CTS: 17 Meas: W (0/2)

A 86 A3-4 Do you use diode characteristic curves

27 28 14 10

0159 IV 1b. Identify the function of each section of a  
typical power supply block diagram. CTS: 21a, 21e,  
21g Meas: W (.5/0)

A 35 A1-35 Do you trace schematic or block diagrams of circuits  
containing transformers

86 93 64 61

D 275 D1-1 Do you trace block diagrams of circuits containing  
power supplies

92 90 75 71

D 288 D2-1 Do you trace block diagrams of circuits containing  
power supply filters

59 52 40 31

0160 IV 1c. Describe the operation of an unfiltered half-  
wave rectifier. CTS: 21a Meas: W (2/0)

D 276 D1-2 Do you trace schematic diagrams of power supply  
circuits

88 81 60 56

D 280 D1-6 Do you perform tasks on half-wave rectifier  
power supplies

31 63 36 29

D	T Task	Y Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B
0161	IV 1d. Describe the operation of an unfiltered full-wave rectifier. CTS: 21b Meas: W	(2/0)					
D 276	D1-2 Do you trace schematic diagrams of power supply circuits	88	81	60	56		
D 281	D1-7 Do you perform tasks on full-wave rectifier power supplies	34	66	36	29		
0162	IV 1e. Describe the operation of an unfiltered full-wave bridge rectifier. CTS: 21c Meas: W	(1.5/0)					
D 276	D1-2 Do you trace schematic diagrams of power supply circuits	88	81	60	56		
D 282	D1-8 Do you perform tasks on full-wave bridge rectifier power supplies	27	72	40	31		
0163	IV 1f. Describe the effect filtering has on the output voltages and waveforms for selected rectifier circuits. CTS: 21a, 21b, 21c, 21g Meas: W	(0/2)					
D 276	D1-2 Do you trace schematic diagrams of power supply circuits	88	81	60	56		
D 280	D1-6 Do you perform tasks on half-wave rectifier power supplies	31	63	36	29		
D 281	D1-7 Do you perform tasks on full-wave rectifier power supplies	34	66	36	29		
D 282	D1-8 Do you perform tasks on full-wave bridge rectifier power supplies	27	72	40	31		
D 289	D2-2 Do you trace schematic diagrams of power supply filters	42	46	33	23		
D 292	D2-5 Do you perform tasks on capacitive power supply filters	19	39	32	21		

D T Y	Task Title	455 X4	456 X6	456 X1A	456 X1B
0164	IV 1g. Given an NIDA Trainer, appropriate printed circuit cards, an oscilloscope and a multimeter, determine the effect upon rectifier output voltages and waveforms as circuit parameters are changed. No Type I, and no more than two Type II errors allowed. CTS: 21a, 21a(1), 21b, 21b(1), 21c(1), 21g, 21g(1) Meas: PC, W (3/0)				
B 153	B1-1 Do you use the multimeter to measure DC voltage values	95	100	98	93
B 154	B1-2 Do you use the multimeter to measure AC voltage values	97	98	93	87
B 165	B2-5 Do you use the oscilloscope to measure ripple voltages	39	58	58	58
D 276	D1-2 Do you trace schematic diagrams of power supply circuits	88	81	60	56
D 289	D2-2 Do you trace schematic diagrams of power supply filters	42	46	33	23
D 292	D2-5 Do you perform tasks on capacitive power supply filters	19	39	32	21
0165	IV 1h. Describe the operation of an unfiltered three-phase rectifier. CTS: 21d Meas: W (1.5/0)				
A 42	A1-42 Do you trace schematic or block diagrams of circuits containing three phase transformers	73	82	46	47
D 283	D1-9 Do you perform tasks on three-phase rectifier power supplies	42	47	34	28
0166	IV 1i. Describe the operation of a voltage doubler. CTS: 21f Meas: W (1.5/0)				
D 284	D1-10 Do you perform tasks on voltage multipliers (doubblers/triplers)	29	49	27	18
0167	IV 2. Transistors 8/3				
0168	IV 2a. Describe the physical characteristics of a bipolar transistor. CTS: 18a Meas: W (0/2)				
A 89	A3-7 Do you trace schematic or block diagrams of circuits containing transistors	92	88	67	68



D	T	Y	Nbr	Task Title	455 X4	455 X6	456 X1A	456 X1B
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0169	IV 2b.	Describe the biasing requirements of NPN/PNP bipolar transistors. CTS: 18a Meas: W			(4/0)			
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A 89	A3-7	Do you trace schematic or block diagrams of circuits containing transistors			92	88	67	68
-----								
0170	IV 2c.	Describe basic transistor configurations. CTS: 18a Meas: W			(2/1)			
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A 89	A3-7	Do you trace schematic or block diagrams of circuits containing transistors			92	88	67	68
C 200	C1-2	Do you trace schematic diagrams of transistor amplifier circuits			51	73	46	38
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0171	IV 2d.	Given an NIDA Trainer, appropriate printed circuit card, and a multimeter, determine the effect that changes in forward bias have on transistor static operation. No Type I, and no more than two Type II errors are allowed. CTS: 18a, 18b Meas: PC, W			(2/0)			
-----								
A 89	A3-7	Do you trace schematic or block diagrams of circuits containing transistors			92	88	67	68
A 91	A3-9	Do you check transistors using an ohmmeter			46	75	55	43
C 200	C1-2	Do you trace schematic diagrams of transistor amplifier circuits			51	73	46	38
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0172	IV 3. Amplifiers			17.5/8				
-----								
0173	IV 3a.	Describe how amplification is accomplished in transistor circuits. CTS: 19a Meas: W			(1/1)			
-----								
A 89	A3-7	Do you trace schematic or block diagrams of circuits containing transistors			92	88	67	68
C 200	C1-2	Do you trace schematic diagrams of transistor amplifier circuits			51	73	46	38

D  
T Tsk  
Y Nbr

Task Title

455 455 456 456  
X4 X6 X1A X1B

0174 IV 3b. Describe the effect that an input signal has  
on the operation of transistor amplifiers. CTS: 19a  
Meas: W (3/1)

A 89 A3-7 Do you trace schematic or block diagrams of circuits  
containing transistors 92 88 67 68  
A 93 A3-11 Do you use transistor characteristic curves 10 25 12 5  
C 200 C1-2 Do you trace schematic diagrams of transistor  
amplifier circuits 51 73 46 38

0175 IV 3c. Given an NIDA Trainer, appropriate printed circuit  
card, a function generator, a multimeter, and an  
oscilloscope, compare static and dynamic operation of  
a common emitter amplifier. No Type I, and no more than  
two Type II errors are allowed. CTS: 18a, 19a, 19b  
Meas: PC, W (2/0)

A 89 A3-7 Do you trace schematic or block diagrams of circuits  
containing transistors 92 88 67 68  
C 200 C1-2 Do you trace schematic diagrams of transistor  
amplifier circuits 51 73 46 38

0176 IV 3d. Describe the effect on voltage gain when changes  
are made in the ohmic values of the biasing network  
and the load resistance. CTS: 19a Meas: PC (2/1)

A 89 A3-7 Do you trace schematic or block diagrams of circuits  
containing transistors 92 88 67 68  
C 200 C1-2 Do you trace schematic diagrams of transistor  
amplifier circuits 51 73 46 38  
C 205 C1-7 Do you measure transistor amplifier voltage, current,  
or power gain 36 57 35 27

D  
T Task  
Y Nbr

Task Title

455 455 456 456  
X4 X6 X1A X1B

0177 IV 3e. Given an NIDA Trainer, appropriate printed circuit card, a multimeter an oscilloscope and a function generator, determine the effect on transistor circuit operation when selected circuit changes are made to alter amplifier gain. No Type I, and no more than two Type II errors are allowed. CTS: 18a, 19b Meas: PC, W (2/1)

A 89	A3-7 Do you trace schematic or block diagrams of circuits containing transistors	92	88	67	68
A 91	A3-9 Do you check transistors using an ohmmeter	46	75	55	43
C 200	C1-2 Do you trace schematic diagrams of transistor amplifier circuits	51	73	46	38
C 205	C1-7 Do you measure transistor amplifier voltage, current, or power gain	36	57	35	27
C 206	C1-8 Do you calculate values of transistor amplifier voltage, current or power gain	20	23	19	9

0178 IV 3f. Describe the effect on voltage gain when changes are made in emitter circuit components. CTS: 19a  
Meas: W (0/1.5)

A 87	A3-5 Do you use diode substitution information	15	46	25	13
C 200	C1-2 Do you trace schematic diagrams of transistor amplifier circuits	51	73	46	38
C 205	C1-7 Do you measure transistor amplifier voltage, current, or power gain	36	57	35	27
C 206	C1-8 Do you calculate values of transistor amplifier voltage, current or power gain	20	23	19	9
C 220	C2-3 Do you perform tasks on emitter (swamping) resistor stabilization amplifie	17	54	27	17
C 221	C2-4 Do you perform tasks on self-bias stabilization amplifiers	14	43	24	11

0179 IV 3g. Given an NIDA Trainer, appropriate printed circuit card, and oscilloscope, and a function generator, determine the effect on transistor operation when an emitter bias stabilization circuit is added. No Type I, and no more than two Type II errors are allowed. CTS: 18a, 19a, 19b Meas: PC, W (1.5/0)

A 89	A3-7 Do you trace schematic or block diagrams of circuits containing transistors	92	88	67	68
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D	T	Task Title	455 X4	455 X6	456 X1A	456 X1B
C 200		C1-2 Do you trace schematic diagrams of transistor amplifier circuits	51	73	46	38
C 205		C1-7 Do you measure transistor amplifier voltage, current, or power gain	36	57	35	27
C 206		C1-8 Do you calculate values of transistor amplifier voltage, current or power gain	20	23	19	9
C 220		C2-3 Do you perform tasks on emitter (swamping) resistor stabilization amplifiers	17	54	27	17

0180 IV 3h. Describe methods used to provide temperature stabilization for a common emitter amplifier. (2/.5)  
CTS: 19a Meas: W

A 89		A3-7 Do you trace schematic or block diagrams of circuits containing transistors	92	88	67	68
C 219		C2-2 Do you troubleshoot amplifier stabilization circuits to circuit level components	20	43	25	8
C 220		C2-3 Do you perform tasks on emitter (swamping) resistor stabilization amplifiers	17	54	27	17
C 221		C2-4 Do you perform tasks on self-bias stabilization amplifiers	14	43	24	11
C 222		C2-5 Do you perform tasks on thermistor stabilization amplifiers	31	46	24	12
C 223		C2-6 Do you perform tasks on diode stabilization amplifiers	22	47	28	17

0181 IV 3i. Determine how class of operation effects the conduction characteristics of an amplifier. CTS: 19a Meas: W (2.5/.5)

A 89		A3-7 Do you trace schematic or block diagrams of circuits containing transistors	92	88	67	68
C 200		C1-2 Do you trace schematic diagrams of transistor amplifier circuits	51	73	46	38

0182 IV 3j. Describe how push-pull amplifiers operate according to class of operation. CTS: 19d Meas: W (.5/1.5)

A 89		A3-7 Do you trace schematic or block diagrams of circuits containing transistors	92	88	67	68
C 200		C1-2 Do you trace schematic diagrams of transistor amplifier circuits	51	73	46	38
C 210		C1-12 Do you work on push-pull transistor amplifiers	22	60	35	23